

CIRCULATING COPY

Please Return Promptly

MAGAZINE

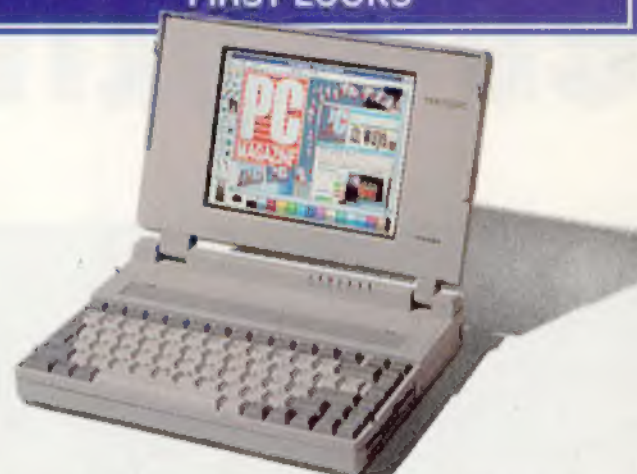
GRAPHICS

**Desktop Publishing:
Low Cost Doesn't
Mean Low-End
Anymore**

HARDWARE

**Envelopes and
Labels: 6 Printers
That Address the
Problem**

FIRST LOOKS



**Toshiba's T4400SXC:
486SX and Active-
Matrix Color in an
8-Pound Notebook**

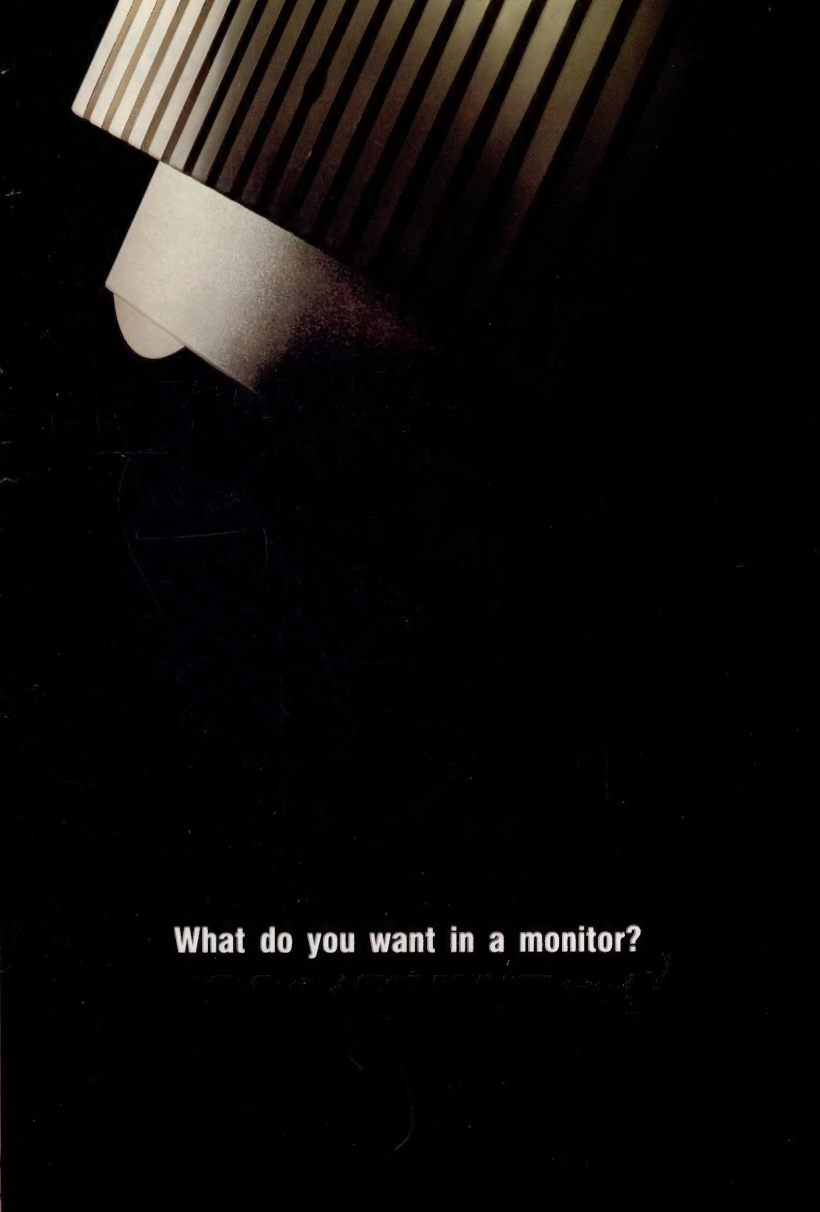
MAY 12, 1992

THE INDEPENDENT GUIDE TO PERSONAL COMPUTING

VOLUME 11 NUMBER 9

How Does the PC Stack Up?

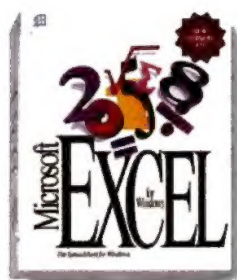




What do you want in a monitor?

MultiSync-W6

Why consider a new you can leave we



Microsoft Excel 4.0, the spreadsheet for Windows.

Because well enough just might not be good enough anymore.

Because new Microsoft® Excel 4.0 for Windows™ is the ultimate refinement of a powerful, easy-to-use spreadsheet.

Because you could be getting your day-to-day spreadsheet tasks, not to mention more amazing number-crunching feats, done faster. And more easily.

We're talking about one-step just-about-everything here.

Take a feature like Autoformat: with just a click of your mouse, it applies one of 14 sharp-looking, professionally designed formats to your worksheet.

Or consider Autofill, which intelligently helps you build your worksheets. For example, when you type January in a cell, Autofill automatically enters February, March, April—as many (or as few) months ahead as you designate.

Shortcut menus are another innovation. When you click the right mouse button, a menu appears on-screen next to whatever you're doing, offering you all the options that sensibly relate to the task at hand.

Wizards are step-by-step guides that take you through complex tasks, like charting, or creat-



The Scenario Manager is a powerful analysis tool that lets you easily create and save multiple "what if" scenarios, then instantly produce nice-looking summary reports. (Which makes you look nice, too.)

ing summary tables from a database, with incredible ease.

And with new Drag and Drop, all you do is highlight the area you want to move, "grab" it with your cursor, and drag and

spreadsheet when it's enough alone?

drop it to wherever you want it on your screen. It's that simple.

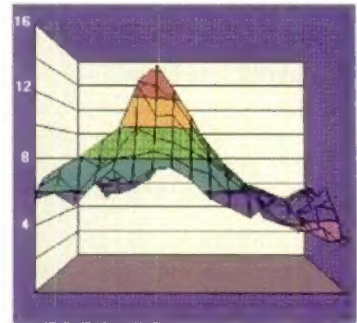
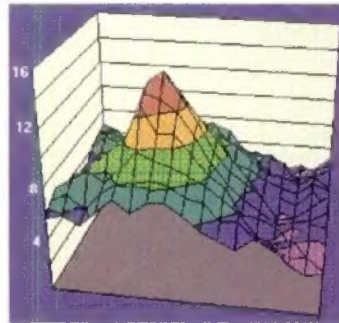
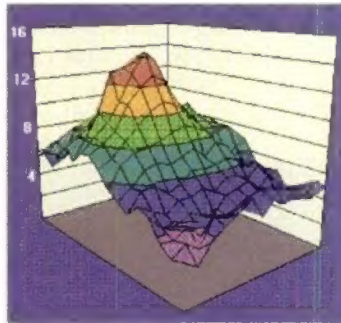
We've also made the Toolbar customizable. Plus, it has handy new features, such as a Spelling Checker and AutoCenter, which lets you center text over multiple columns with a single click of your mouse.

Invested a lot of time in Lotus®? That's no problem. You can learn using what you know. Type in your familiar Lotus 1-2-3® commands, and Microsoft Excel shows you the equivalent commands. Easy.

Microsoft Excel also reads and writes your Lotus files. And it runs your macros—unmodified. It even comes with a convenient 90-

day money-back guarantee.

By now, you may agree with us that new Microsoft Excel 4.0

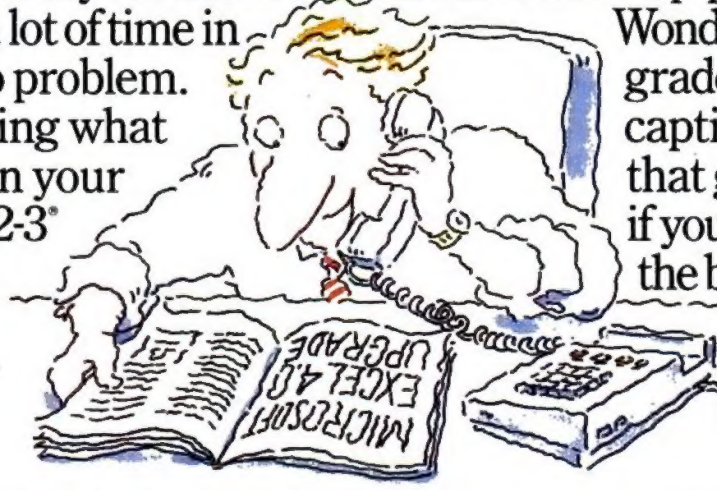


The gallery of 90 chart types includes rotating 3-D charts, along with surface, radar and picture charts. It looks great here. It's even more impressive on your screen.

for Windows is the ultimate refinement of one-step-power-with-ease.

Wondering how to upgrade? Check out the caption underneath that guy to your left—if you're interested in the best spreadsheet

on the planet, that is. Otherwise, just try to forget you ever saw this.



Even upgrading is easy. It's \$99 for current Microsoft Excel users, and \$129 if you're using Lotus 1-2-3 or Borland® Quattro® Pro! Call us at (800) 323-3577, Dept. Y63, to order yours. Or see your local software reseller.

Microsoft®

Our V.32bis Scout is Trustworthy.



A Scout is trustworthy.

Digicom Systems has the most trusting kind of high-speed modems, the Scout Series. Our Adaptive Rate feature ensures that each connection is at the fastest and most reliable speed.

Data throughput up to 57,600 bps.

Fully compliant with CCITT standards, the Scout and ScoutPlus features CCITT V.42bis, MNP 5 data compression and error correction for data throughput up to 57,600 bps.

WYSIWYG Faxing.

The ScoutPlus combines V.32bis 14,400 bps data and send and receive fax with Delrina's WinFax LITE and DosFax LITE software. The Scout is a fully V.32 compliant 9600 bps data modem.

Digicom incorporates award-winning engineering, service and support in every product.

Features	Scout	ScoutPlus
CCITT V.32bis (14,400 bps)	✓	✓
CCITT V.32 (9600 bps)	✓	✓
CCITT V.22bis (2400 bps)	✓	✓
CCITT Group 3 send/receive fax	✓	✓
CCITT V.42bis / MNP 5	✓	✓
CCITT V.42 / MNP 2, 3 and 4	✓	✓
Internal half-card (w/16550 UART)	✓	✓
External	✓	✓
Data communications software	Qmodem	
Warranty	5 years	

Call 1-800-833-8900
for more information



Digicom Systems, Inc.

188 Topaz Street • Milpitas • CA • 95035

© 1992 Digicom Systems, Inc. Scout and ScoutPlus are trademarks of Digicom Systems, Inc. All other product names and company names are trademarks of their respective companies.

CIRCLE 188 ON READER SERVICE CARD

Inside

Integrating systems based on architectures other than Intel's x86 promises to become more important as the desktop computing environment grows more diverse. That's why our cover story examines the latest workstation offerings from Apple, NeXT, and Sun. We show you how well these workstations fit into the PC-based environment. And we show you how they stack up against a state-of-the-art PC—the 50-MHz Dell PowerLine.

Developing a testing methodology to compare and contrast these disparate platforms was one of the first challenges facing PC Magazine Labs technical director Nick Stam when he joined the magazine last November. "As we explored different strategies," he says, "we discovered

that ease of use and the ability to integrate into the PC environment were of paramount importance. Performance testing was a secondary concern." But even performance testing required two stages: "For each platform, we tested applications that would show off the environment. And to compare the different system architectures, we measured the speed of particular functions within applications that crossed platform boundaries."

Stam is no stranger to mixed computing environments. A 12-year industry veteran, he has developed software, managed products, and acted as the



technical manager for a Banyan and Novell value-added reseller. Most recently, he was the testing director for National Software Testing Laboratories (NSTL).

As technical director of PC Labs, Stam works with project leaders and editors to develop testing strategies for the whole range of comparative product reviews we publish. "We solicit input from end users and vendors," he explains, "because they have the

strongest understanding of product features and usage patterns." Feedback from the vendor community proved especially useful in the cross-platform story, where we asked each company to identify the applications that best exploit its platform.

Stam also has ongoing re-

sponsibility for PC Magazine Labs' benchmark tests. "We must constantly evaluate and improve the effectiveness of our benchmark test code to reflect advances in such dynamic areas as processor technologies and video, memory, and disk subsystems," Stam explains. To enhance the current suite of tests, he is working closely with former PC Labs technical director Robert W. Kane, who is now the benchmark test manager of ZD Labs, a division of Ziff-Davis Publishing that provides testing services to all the affiliated periodicals.

—C. James Galley III



PC Magazine Labs' technical director, Nick Stam, sizes up the NeXT workstation and the Dell PowerLine.

PC Magazine: The Independent Guide to Personal Computing, ISSN #0898-8507, is published biweekly except in July and August for \$44.97 for one year. Ziff-Davis Publishing Co., a division of Ziff Communications Co., One Park Ave., New York, NY 10016. Second-class postage paid at New York, NY 10016 and at additional mailing offices. POSTMASTER: Address changes to PC Magazine, P.O. Box 54093, Boulder, CO 80321-4093.

D IAMOND PRO 14

Power Windows



TWO-YEAR WARRANTY

14" FINE DOT PITCH CRT

HIGH RESOLUTION

FLICKER-FREE PERFORMANCE

LOW EMISSION DESIGN

Looking for a high-performance 14" color monitor for general business Windows™ and cost-effective CAD applications? Consider the new Diamond Pro 14 from Mitsubishi Electronics. It offers the 1024 x 768 non-interlaced maximum resolution for flicker-free 72 Hz compatibility required for Windows and other GUI environments.

The Diamond Pro 14 provides unparalleled clarity with its ultra-fine 0.28 mm dot pitch and operation versatility with a broad auto-scan range for all current high-refresh PC, PS/2™ and Macintosh® graphics standards. Its new design allows simple plug and play set-up. And it meets today's concerns for low magnetic emission.

For a Windows monitor that's easy on the eyes and easy on the pocketbook, the choice is clear: Diamond Pro 14. For more information, call Mitsubishi Electronics at 1-800-843-2515 or in Canada 1-800-387-9630.

 **MITSUBISHI**
INFORMATION SYSTEMS DIVISION

Mitsubishi Electronics America, Inc., Information Systems Division, 5665 Plaza Drive, Cypress, CA 90630.
Mitsubishi Electric Sales Canada, Inc., 4299 14th Avenue, Markham, Ontario L3R 0J2.

© 1992 Mitsubishi Electronics America, Inc. Mitsubishi is a registered trademark of Mitsubishi Electric Corp., Tokyo.
All other trademarks or registered trademarks are the property of their respective holders.

CIRCLE 280 ON READER SERVICE CARD





Epson Reliability. As you'd expect from the longest-running printer company, the ActionPrinter is built to last. And backed solidly by our two-year warranty.

*Under
\$300*

A Simple Lesson In

Unique Paper Tray. The only dot matrix printer with a paper cassette tray. So you won't get fed up handling tractor feed paper.



Quick & Quiet. In case you haven't heard, the ActionPrinter is considerably quieter than the average dot matrix printer—even when zipping along at 250 characters per second.



Easy To Use. Setup and operation couldn't be simpler. And Epson's convenient Quick Reference Card keeps you from struggling through hefty user manuals.

EPSON *ActionPrinter* Quick Reference Card 3250

This card summarizes the printer instructions you'll need most often. For detailed information on any of these topics, see your User's Guide.

Loading the Paper Cassette



Very, Very Affordable. With a list price of just \$299, this is clearly a printer anyone can feel at home with.

SCALABLE FONTS

Quality Output. You can print a variety of letter-quality type in a variety of sizes, and give all your work a more professional look.

Home Economics.

Compact & Lightweight. The design is revolutionary: the ActionPrinter sits flat or stands upright, fitting easily in any workspace. The perfect printer to have around the house or apartment.



The new Epson® ActionPrinter™ 3250 is the first dot matrix printer built specifically for the home user. Its design is sleek and space-saving. Its features practical and easy to use. Its construction, Epson solid. All for a price that's nothing short of amazing.

For a free introductory course in printers, turn to our booklet, "What You Should Know Before Buying A

Dot Matrix Printer." Just call 800-289-3776 for your copy, and the name of the Epson dealer nearest you.

Then stop in soon. And take home a printer that could teach the others a lesson or two.

EPSON
WHAT YOU
SHOULD
KNOW BEFORE
BUYING A
DOT MATRIX PRINTER.



EPSON



Desktops



Dot Matrix



Notebooks



Lasers



Servers

UP FRONT

- 4 INSIDE**
- 17 LETTERS**
- 29 TRENDS**
 - On-Board Networking
 - The Right Mouse Button Lives!
 - OS/2 Apps?
 - CD-ROM Recording
- 37 FIRST LOOKS**
 - **Toshiba T4400SXC:** Top-of-the-line color from a bright active-matrix display.
 - **IBM PS/2 Model 56 SLC:** New SLC chip with integrated cache speeds performance.
 - **AutoCAD Extension for Windows:** First steps toward true 32-bit graphical CAD.
- 59 NEW AND IMPROVED**
Emerson Andrew Torgan
- 71 READ ONLY**
Carol Levin
- 77 TOOLKITS**
Trudy Neuhaus

COLUMNISTS

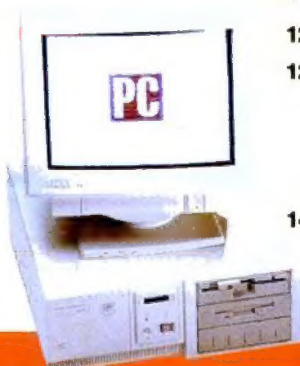
- 81 MICHAEL J. MILLER**
A Long Way
From VisiCalc
- 87 BILL MACHRONE**
The Perfect Laptop,
Continued
- 93 JOHN C. DVORAK**
The Software
Piracy Bluff
95 **Inside Track**
- 99 JIM SEYMOUR**
LAN Licenses: It's
Not Black and White
- 107 WILLIAM F. ZACHMANN**
Can OS/2's Shell Help
Crack Its Market?

COVER STORY

113 COMPUTERS

Platforms: How the PC Stacks Up

Jim Seymour/ Computers and operating systems from Apple, Sun, and NeXT have their strengths and purposes, but when it comes to price, performance, and everyday business, nothing beats the PC.



116 Silicon Graphics: Hidden Power

122 Performance Tests

127 The Macintosh:

The Choice for Graphics

Jon Zilber/ The Apple platform is best known for ease of use and great graphics software. Can the PC compete?

143 The Sun SPARCstation

2GX: A Number-

Cruncher's Dream

Don Crabb/ Here's one

powerful option for high-end science, engineering, and CAD.

153 The NeXT Generation

M. Keith Thompson/ NeXT presents an elegant platform for custom apps and multimedia.

167 PCs: A Matter of Choice

Julie Cohen/ The most popular platform, represented by the Dell PowerLine 450DE, goes head to head with three alternatives.

FEATURES

173 CONNECTIVITY

Across the Great Divide: PC-to-Mac Connections

Jeffrey L. Carrell and David Greenfield/ Macintoshes and PCs can coexist peacefully. Solutions for using both platforms effectively range from inexpensive file-transfer packages to powerful products designed to bring Macs aboard the most complex multiserver operating systems. Our essays on the options available will help you get those computers talking.



174 Highlights

176 Navigating the PC-to-Mac Minefield

223



- 240 Access to Platinum
- 244 ACCPAC Simply Accounting for Windows
- 245 Act 1 Plus
- 248 BusinessVision II
- 248 Crystal Accounting
- 254 DacEasy Accounting System

SOFTWARE

Low-Cost Accounting Software: Big Gains for Small Business
Raymond A. August and Ted Stevenson/ Entrepreneurs and small-business people need to keep accurate books, but they're not usually accountants. *PC Magazine* looks at 16 under-\$300 packages that are rich in features—and some are even easy to use.

- 258 General Business System
- 260 Manage: Complete
- 274 M.Y.O.B.
- 276 One-Write Plus AccountingWorks
- 279 Pacioli 2000
- 281 PC Accountant
- 283 pc/MRP
- 284 Peachtree Complete III
- 291 Takin' Care of Business
- 292 Teknon Accounting

- 226 Editors' Choice
- 230 Small-Business Futureware: Intuit's QuickBooks
- 235 Glossary: Accounting as a Second Language
- 238 Suitability to Task
- 256 Consumables That Won't Consume Your Budget
- 262 Summary of Features
- 274 Low-Cost Accounting: Getting Easier Every Day

FEATURES

295 GRAPHICS

Personal Publishing Comes of Age: Five Low-Cost DTP Packages

Luisa Simone/ Not everyone needs to climb the steep learning curve or pay the steep prices of *PageMaker* or *Ventura Publisher*. We look at five DTP programs that help you quickly and easily produce attractive publications for half the price of their high-end kin.

302 Avagio
322 Express Publisher
323 Microsoft Publisher
324 PagePlus
326 Publish-It!

296 Fit to Print
298 Newsletter Design 101
300 Editors' Choice
302 Suitability to Task
304 Summary of Features
320 When a Word Processor Will Do

329 HARDWARE

Label and Envelope Printers: Easy Addressing

M. David Stone/ With performance good enough to handle 1 to 100 labels or up to 50 envelopes at once, these six label and envelope printers from Avery, CoStar, Eltron, Seiko, and Tidemark are the answer for many users' addressing needs. The price is right, too: Three of the four label printers cost less than \$300, and one of the envelope printers is under \$600.

344 Avery Personal Label Printer
349 CoStar LabelWriter II
349 Eltron LP-2042
359 Seiko Smart Label Printer Plus
359 CoStar AddressWriter
360 Tidemark Address Express

330 Highlights: Label and Envelope Printers

339 Editors' Choice
340 Printing Labels: Choosing the Software Alternative



342 Assessing Print Quality
350 Summary of Features
352 Performance Tests

AFTER WORDS

486 AFTER HOURS

Microsoft Flight Simulator 4.0 add-ons: From navigation aids, new plane types, and additional scenery disks to actual mechanical consoles, *PC Magazine* uncovers products to enliven your PC flying experience.

490



ABORT, RETRY, FAIL? *Bill Howard*

407 Direct Marketing Connection
441 Marketplace Premier
440 Index to Advertisers
481 Reader Service Card
473 Editorial Product Index
485 Coming Up
482 Advertisers' Product Index

SOLUTIONS

367 ADVISOR

Joe Salemi/ Add memory to PS/2s; unload NetBIOS from memory without rebooting.

369 TUTOR

Jeff Prorise/ A quick and easy way to choose among several configurations.



371 USER-TO-USER

Neil J. Rubenking/ Determining whether your batch files are executing under Microsoft Windows.



373 THE WORKING WORD

M. David Stone/ Searching and replacing hyphens in *WordPerfect 5.1* is possible when you know what you're looking for.

375 SPREADSHEETS

Craig Stinson/ Keep your *Excel* database's print area current even when you forget to update it; modify WYSIWYG.CNF and you won't have to select a printer when you create a new worksheet.

377 CONNECTIVITY

Frank J. Derfler, Jr./ Control power to your computer by calling it on the phone; a handy product that efficiently manages e-mail messages.

378 PC MAGNET

Scott McGrath/ More advanced programs that help you get the most value from the time you spend on ZiffNet.

PROGRAMMING

380 UTILITIES

Bob Flanders and Michael Holmes/ You Can End the Download Delay with BACKDOWN.EXE



390 LAB NOTES

Douglas Boling/ Putting Serial Port Technology in Perspective, Part 1



394 ENVIRONMENTS

Charles Petzold/ Creating a Computer Drum Machine, Part 1



397 POWER PROGRAMMING

Ray Duncan/ Processing Ink in a Pen Windows Application

401 DATABASES

Sal Ricciardi/ An improved way to use BROWSE in lieu of pick lists in *dBASE IV*; using the TONE() function for a delay in *Clipper*; optimizing field sizes in *dBASE* and *FoxPro*.

403 LANGUAGES

Sharon Terdeman/ Minimize the size of your programs, using a home-grown function rather than standard library routines to generate date-time strings.





Publishing Director Bill Machrone

Editor-in-Chief Michael J. Miller

Editor Joel Dreyfuss

Executive Editors Bill Howard, Robin Raskin

Workgroup Systems Editor Frank J. Derfler, Jr.

Senior Editors Christopher Barr (West Coast), Trudy Neuhaus (Technical Columns), Don Willmott (First Looks)

Managing Editors Diane D'Angelo, Paul B. Ross

Assistant Managing Editor Dianne H. McDonald

Manager, Copy Edit Karen A. Carter **Associate Editors** Sheryl Canter (Applications Development), Julie Cohen (PCs), Mary Kathleen Flynn (Trends), David Greenfield (Connectivity), Lori Grunin (Graphics), Matthew J. Ross (First Looks), Ted Stevenson (Software), Sharon Terdeman (Technical Columns), Jennifer Zaino (Hardware)

Technical Editor Neil J. Rubenking **Copy Chief** Glen Becker **Staff Editors** Michael Cohn, Gayle C. Ehrenman, Carol Levin, Michael W. Muchmore, Ann Ovodow, Oliver Rist, Craig L. Stark, Lance N. Ulanoff **Copy Editors**

Jeanne Albrecht, Nina Barringer, Karen Best, Robin B. Bornstein, Jamie M. Bsaies, Catherine Kunkemuller

Assistant Editors Shari L. Girouard, Elynn McCasland, Kim Schueler, Emerson A. Torgan **Layout Manager** Linda

Harms **Senior Layout Editor** Lillian Gaffney **Librarian** Thomas W. Giebel **Library Assistant** Dolores Williams

Researcher/Reporter Angela Gunn **Editorial Researchers** Eric Berlin, Camille N. Cline, Brad Grimes, Andrew C.

Kantor, Susan G. Thomas **Editorial Assistants** Tin Albano, Daniel A. Begun **Proofreaders** Kimberly Lee, Chris

Regan **Business Manager** Justine Casey Gaeta **System Support Manager** Craig Ellison **Network**

Administrator Debbie Lewis **Assistant to the Publishing Director** David Baker **Assistant to the Editor-in-Chief**

Tara Caulfield **Assistant to the Editor** Rita Arahamian **Assistant to the Executive Editors** Christina M. Evelyn

Administrative Assistant Christina Okang

Contributing Editors Douglas Boling, Bruce Brown, Ray Duncan, John C. Dvorak, Mitt Jones, Michael J. Meford,

Edward Mendelson, Bill O'Brien, Charles Petzold, Alfred Poor, Jeff Prossie, Winn L. Rosch, Joe Salemi, Jim

Seymour, Richard Hale Shaw, Barry Simon, Luisa Simone, Craig Stinson, M. David Stone, Gus Venditto, Ethan

Winer, William F. Zachmann

Support Associate, PC MagNet Louise Laberge **Sysop, PC MagNet** Ken Hipple

Art Director David Herbig **Associate Art Directors** Robert C. Smith, Charles Conover **Assistant Art Director**

Michael L. Graham **Associate Graphics Director** Gary W. Kaplow **Graphic Artists** Simone Blank, David Foster,

Robin L. Malik **Assistant to the Art Director** Frieda T. Smallwood

Director, PC Labs C. James Galley III **Technical Director, PC Labs** Nick Stam **Project Leaders** Rick Ayre

(Software), Richard Brady (Connectivity), Jeff Mace (Graphics), Stephen W. Plain (Applications Development),

Alan M. Stoughton (PCs), Michael J. Zulich (Hardware) **Sr. Programmer** Stuart R. Greenberg **Programmer**

Bradley G. Epranian **Product Testing Manager** Charles Rodriguez **Sr. Tech. Analyst** William Bettini **Tech.**

Analysts Mario Baldasserini, Jimmy Beltran **Support Technicians** Melvin Acevedo, Laura Cox, Carolyn

Falconer, William P. Flanagan, Margaret A. Piemonte, Edgar Rojas, Dan Smith **Operations Manager** John R.

Delaney **Inventory Control Coordinators** Peter Bastide, Rob Graydon, John Jones **Administrative Assistant**

Gail M. Chapman

Publisher Jeff Ballou

Director, Marketing Ellen Atkinson **Director, Networking** Anna Zomosa **Events** Stacy O'Connell **Market**

Information Michael Van Engen **Sales Development** Jeff Stanley **Subscriptions** Charles Mast **Single Copy**

Sales James E. Gerth

Senior Advertising Production Manager Vicki Egan Root **Advertising Production Manager** Lori Iaccino

Assistant Advertising Production Managers Pamela Berkowitz, Oris D'Amil **Editorial Production**

Coordinators Kevin S. Fagan, Jo-Ann Hirschel

Advertising Office: One Park Ave., New York, NY 10016; 800 33 MAG AD, 212-503-5100

Subscription Problems: 800-289-0429, 303-447-9330 (outside the U.S.)

ZIFF-DAVIS PUBLISHING COMPANY

Chairman and CEO Eric Hippeau

President J. Scott Briggs

Executive Vice President Ronni Sonnenberg

Group Vice President J. Samuel Huey

Group Vice President, Worldwide Direct Publications

Jim Stafford

Senior Vice President, Marketing Paul H. Chook

Senior Vice President Rachel Greenfield

Vice Presidents Baird Daves (Operations), Howard D.

Skolnik (Controller), Herbert Stern (Creative Services),

Marian O. White (Research), Bert Lacy (Circulation), James

F. Ramaley (Circulation Services), Ann Pollak Adelman

(Marketing Services), Roger Hermann (Production),

Frank Kelcz (Europe), Alan Power (Asia-Pacific),

ZIFF COMMUNICATIONS COMPANY

Chairman William B. Ziff, Jr.

President Philip B. Korsant

Executive Vice President Philip Sine

Senior Vice President Hugh Tietjen

Vice President, General Counsel, and Secretary

J. Malcolm Morris

Vice President, Controller, and Treasurer

Bill Machrone (Technology), Paul Stafford (Classified

Advertising), William L. Phillips, Claude P. Sheer

Vice President and General Manager Louis B. Dotti

Executive Director, Information Systems John Helliwell

National Managing Director, Magazine Networks

Joseph Gillespie

Directors Steven Rosenfield (Business Development),

Jeff Weiner (Corporate Development), Jean Lamensdorf

(Licensing), Gary A. Gustafson (Planning), Walter J.

Terlecki (Production), Dan Leonetti (Sales Training),

Susan Delman (Corporate Marketing), Lewis D'Vorkin

(Editorial), Beth Springer (Ziff-Davis Labs), Gregory M.

Jarboe (Public Relations)

Business Manager, Publishing Operations

Tom McGrade

Patrick J. Burke, Jr.

Vice President, Human Resources

Frederick K. Staudmyer

Vice President, Business Manager T.L. Thompson

Vice President, Chief Information Officer Thor Olson

Vice President, Electronic Editorial Director

Michael Kolowich

Vice Presidents Seth R. Alpert, Steven C. Feinman

Editorial and Business Office: One Park Ave., New York, NY 10016 Editorial: 212-503-5255; Advertising: 800 33 MAG AD, 212-503-

5100. *PC Magazine* is an independent journal, not affiliated in any way with International Business Machines Corp. IBM is a registered

trademark of International Business Machines Corp. Entire contents copyright ©1992 Ziff-Davis Publishing Company, a division of Ziff

Communications Company. All rights reserved; reproduction in whole or in part without permission is prohibited. The following are

registered trademarks of Ziff Communications Company: PC, *PC Magazine*, PC Labs, PC MagNet, PC Magazine Award for Technical

Excellence, PC Magazine Editors' Choice Award. The following are trademarks of Ziff Communications Company: Abort, Retry, Fail?;

Connectivity; Databases; Direct Marketing Connection; First Looks; New and Improved; Advisor; Lab Notes; PC Marketplace; Pipeline;

Trends; Tutor; The PC Utilities; Power Programming; Power User; Read Only; Spreadsheets; User-to-User; The Working Word.

SUBSCRIPTION INQUIRIES, ADDRESS CHANGES

Subscription Services: For subscription service questions,

address changes, or ordering information, call toll-free 800-289-

0429 in the U.S. and Canada; all other countries, please contact

Ireland: 353-61411466 or fax 353-61418457. Or write to *PC*

Magazine, P.O. Box 54093, Boulder, CO 80322-4093.

Subscription Rate: The subscription rate is \$44.97 for a 1-year

subscription (22 issues). Canada and all other countries, please

add an additional \$32.00 for postage. GST Registration Number:

R-123669673.

Back Issues: For back issues (subject to availability), \$8 per

issue (\$9 outside the U.S.), send check or money order to Back

Issues Department, Ziff-Davis Publishing Company, P.O. Box

53131, Boulder, CO 80322-3131.

HOW TO CONTACT THE EDITORS

The editors of *PC Magazine* want to hear from you. Please send

your questions, complaints, compliments, and submissions to *PC*

Magazine, One Park Ave., New York, NY 10016. Send electronic

mail to MCI Mailbox 157-9301 (*PC Magazine*) or PC MagNet

(see below). *PC Magazine's* general number is 212-503-5255.

The West Coast Operations number is 415-378-5500. For other

Ziff-Davis publications, call 212-503-3500.

We are unable to look up stories from past issues, recommend

products, or diagnose problems with your PC by phone. If you

bought a product advertised in *PC Magazine*, are dissatisfied,

and can't resolve the problem, write (do not call) Alicia Dwek,

Advertising Department at One Park Ave. Include copies of

correspondence.

PC Magazine is under no obligation to review unsolicited

products. All submissions accepted for publication become the

property of *PC Magazine*. We will pay \$50 for Productivity user

tips and Abort, Retry, Fail? submissions. For submissions to

Abort, Retry, Fail?, if you send artwork for possible reproduction,

mark the funny part on a photocopy, not the original.



PC MAGNET: PC MAGAZINE'S

ON-LINE SERVICE

PC Magazine operates PC MagNet, an on-line

service where readers can find the utilities

published in each issue, download an index of

reviews, share opinions with the editors, and access

Computer Library. To join, set your communications

software for either 300 or 1,200 bits per second, 7 data

bits, even parity, 1 stop bit, and full duplex. To find the

number nearest you, dial 800-346-3247. (In Canada,

call 800-635-6225, voice only.) When the modem

connects, press Enter. At the HOST NAME prompt,

enter PHONES. Follow the menus and note the number

closest to you.

After you have found the phone number, hang up and

dial using the number you just found. When you connect

with PC MagNet, press Ctrl-C. At the HOST NAME

prompt, enter CIS. At the USER ID prompt, enter

177000,5000. Enter PC:MAGNET at the PASSWORD

prompt and Z11D9200 at the ENTER AGREEMENT

NUMBER prompt. CompuServe members can join by

entering GO PCMAG at any CompuServe prompt. To

upload a letter, type GO PCM:FORUMS. For Customer

Service, call 800-848-8990. PC MagNet costs \$12.80

per hour via MasterCard, VISA, or American Express.

PERMISSIONS, REPRINTS

Material in this publication may not be reproduced in any

form without permission. If you want to quote from an

article or use *PC Magazine's* logo in conjunction with an

Editors' Choice designation, write Chantal Lavelanet; for

information on reprints in quantities of 500 or more, write

Claudia Crichlow.

PC MAGAZINE REVIEWS

Except where noted: All *PC Magazine* reviews are of

currently available products. Comparative reviews are

arranged alphabetically by product name for software,

by company name for hardware. Software is free from

copy protection. On benchmark test charts, shorter bars

indicate faster products (less time to complete a task).

Benchmark and performance tests are run on Compaq

Deskpro 386/25s and 25es.



YOU COULD BUY ANOTHER COMPUTER BESIDES AN AUSTIN.



■ AUSTIN 486/33i WINSTATION \$2695

INTEL 80486 PROCESSOR, 128K CACHE RAM, 8MB RAM, 200MB IDE HARD DRIVE, 16-BIT VGA WITH 1MB,
14" 1024X768 NON-INTERLACED VGA COLOR MONITOR, 101 KEYBOARD, LOADED MS-DOS AND MS-WINDOWS,
MOUSE, ONE YEAR G.E. ON-SITE SERVICE.



YOU COULD ALSO BONDS, STICK YOUR AND PET A

YOU COULD BUY AN EXPENSIVE COMPUTER. AND PAY A SMALL FORTUNE FOR THEIR NAME,  THEIR



FANCY CORPORATE HEADQUARTERS AND THEIR EXECUTIVE V.P.'S COMPANY CAR AND



STOCK

TO ORDER
CALL:

1-800-752-1577

OPTIONS. YOU COULD BUY A CHEAP, NO-NAME COMPUTER. AND WIND UP

WITH NO QUALITY, NO SUPPORT, IN A NO-WIN SITUATION. OR YOU COULD

BUY AN AUSTIN. AND GET EVERYTHING YOU'D EXPECT FROM ONE OF THOSE BIG NAME COMPUTERS

EXCEPT A BIG NAME PRICE. AUSTIN COMPUTERS ARE BUILT TO YOUR OWN SPECIFICATIONS WITH THE



INVEST IN JUNK FINGER IN A SOCKET PIT BULL.

HIGHEST QUALITY, NAME BRAND COMPONENTS. THEY'RE THE
ONLY PC'S THAT ARE BURNED-IN WITH THE HARDWARE AND
SOFTWARE INSTALLED. AND EVERY AUSTIN COMES WITH A FULL YEAR OF
G.E. NEXT-DAY, ON-SITE SERVICE. WHICH DOESN'T MAKE AN AUSTIN THE
ONLY COMPUTER YOU COULD BUY. JUST THE ONLY ONE YOU
SHOULD.

AUSTIN COMPUTER SYSTEMS



MAKE A LOGICAL, RATION

(BUY THE ONE YOU

TEN BRAINY REASONS TO BUY AN AUSTIN.

1. ONLY AUSTIN HAS THE INTELLIGENCE TO BURN-IN 100% OF YOUR SYSTEM AND TEST EACH COMPONENT FOR COMPATIBILITY.
2. IN CASE OF THE WORST, OUR ONE YEAR, ON-SITE SERVICE IS THE BEST, ESPECIALLY SINCE IT'S FREE. WE ALSO OFFER EXTENDED WARRANTIES ON BOTH PARTS AND LABOR. G.E. WILL SERVICE YOUR COMPUTER IN THE U.S., MEMOREX TELEX IN CANADA.
3. EVEN THE BRIGHTEST PEOPLE DON'T HAVE ALL THE ANSWERS. SO WE HAVE A 24 HOUR, TOLL-FREE TECHNICAL SUPPORT HOTLINE.
4. SOME OF THE MOST KNOWLEDGEABLE PEOPLE IN THE BUSINESS, THE EDITORS AT PC MAGAZINE, HAVE GIVEN US FIVE OF THEIR "EDITOR'S CHOICE" AWARDS.
5. AS A NOVELL "GOLD AUTHORIZED" RESELLER, AUSTIN CAN PROVIDE COMPLETE NETWORK INSTALLATIONS WITH A SUPPORT PACKAGE THAT
- IS UNMATCHED ANYWHERE IN THE INDUSTRY.
6. BEING SMART HAS ITS REWARDS. BUY AN AUSTIN AND YOU GET MICROSOFT WINDOWS, A MOUSE AND DOS, ALL FREE.
7. WE'LL LOAD ANY PROPRIETARY SOFTWARE YOUR COMPANY HAS, FREE. IF YOU PAY SOMEONE ELSE TO DO IT, YOU'D HAVE TO HAVE ONE BOAT IN THE WATER.
8. ALL YOU NEED TO KNOW WITH AN AUSTIN IS HOW TO PLUG IT IN. WE CONFIGURE THE SYSTEM, FORMAT THE HARD DRIVE AND INSTALL ALL YOUR SOFTWARE.
9. AUSTIN USES ONLY HIGH QUALITY, STANDARDIZED COMPONENTS TO GIVE YOU MORE SUPPORT AND UPGRADE OPTIONS. WE WERE THINKING AHEAD.
10. OUR SPECIALLY TRAINED SALES PEOPLE KNOW WHAT THEY'RE SELLING AND CAN ANSWER YOUR QUESTIONS, 24 HOURS A DAY.



AL, INTELLIGENT DECISION. THINK'S THE COOLEST.)



\$1995

386/SX25 NOTEBOOK
10" VGA LCD DISPLAY,
60MB IDE HARD DRIVE,
1.44MB FDD AND 1MB RAM.
(6 CELLS WITH BATTERY.)

\$1245

386/SX16 VLI WINSTATION
VGA COLOR MONITOR,
40MB HARD DRIVE
AND 2MB RAM

\$2990

486/33 E LOCAL BUS WINTOWER
32-BIT LOCAL BUS SLOT
TTL MONO MONITOR,
125MB IDE HARD DRIVE
AND 8MB RAM.

**AUSTIN 386/SX16 VLI
WINSTATION**

\$1245

Microprocessor: 386/SX
running at 16MHz
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse
Storage: 40Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 2Mb RAM
Video: 14" VGA
color monitor.

**AUSTIN 386/SX20 VLI
WINSTATION**

\$1690

Microprocessor: 386/SX
running at 20MHz
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse
Storage: 80Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 4Mb RAM
Video: 14" 1024
VGA color monitor

**AUSTIN 386/25 VLI
WINSTATION**

\$1790

Microprocessor: 386 run-
ning at 25MHz
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse
Storage: 80Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 4Mb RAM
Video: 14" 1024 N1
VGA color monitor

**AUSTIN 386/33 VLI
WINSTATION**

\$1990

Microprocessor: 386 run-
ning at 33MHz, 64k Cache
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse
Storage: 125Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 4Mb RAM
Video: 14" 1024 N1
VGA color monitor

**AUSTIN 386/33 U
WINSTATION**

\$2145

Microprocessor: 386 run-
ning at 33MHz, 128k Cache
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse
Upgradable
Storage: 125Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 4Mb RAM
Video: 14" 1024 N1
VGA color monitor
TRUE UPGRADABLE

**AUSTIN 486/33 VLI
WINSTATION**

\$2290

Microprocessor: 486 run-
ning at 33MHz, 64k Cache
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse
Storage: 125Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 4Mb RAM
Video: 14" 1024 N1
VGA color monitor

**AUSTIN 486/33 E
LOCAL BUS WINTOWER**

\$2990

Microprocessor: 486 run-
ning at 33MHz, 64k Cache
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse. 32-bit
local bus slot
Storage: 125Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 8Mb RAM
Video: TTL Mono
Monitor

**AUSTIN 486/50 E
LOCAL BUS WINTOWER**

\$3990

Microprocessor: 486 run-
ning at 50MHz, 64k Cache
Special Features: Pre-load-
ed with MS-Windows, MS-
DOS and a mouse. 32-bit
local bus slot
Storage: 200Mb IDE Hard
Drive, 1.44 and 1.2 Mb FDD
Memory: 8Mb RAM
Video: TTL Mono
Monitor



TO ORDER CALL:

1-800-752-1577

VAR 1-800-330-1860 OVERSEAS (512) 339-3900
GOVT 1-800-833-4472 NETWORKING 1-800-874-7182
FAX (512) 454-1357 CANADA 1-800-339-1565
FORTUNE 1-800-1-800-422-5806

NOW OPEN 24 HOURS

AUSTIN COMPUTER SYSTEMS
10300 METRIC BLVD., AUSTIN TX 78758



AWARD WINNING VALUE AND PERFORMANCE, CONFIGURED EXACTLY HOW YOU WANT IT!

Simply choose the basic system configuration that meets your needs, then add the hard drive and video combination that you want. Or, you can call Acma for other custom configurations and networking options.

Hard Disk Drive Options		SVGA Monitor & Graphics Adapter Options						
		14"		15"		17"	20"	21"
		SVGA Non-int	Seiko 1450	NEC 3FGX	NEC 4FG	NEC* 2050	Seiko 2050	NEC*
IDE	52MB	\$700	\$900	\$1,000	\$1,100	\$1,600	\$2,200	\$2,600
	120MB	\$800	\$1,000	\$1,100	\$1,200	\$1,700	\$2,300	\$2,700
	240MB	\$1,100	\$1,300	\$1,400	\$1,500	\$2,000	\$2,600	\$3,000
ESDI	150MB	\$1,300	\$1,500	\$1,600	\$1,700	\$2,200	\$2,800	\$3,200
	340MB	\$1,800	\$2,000	\$2,100	\$2,200	\$2,700	\$3,300	\$3,700
	676MB	\$2,100	\$2,300	\$2,400	\$2,500	\$3,000	\$3,600	\$4,000
SCSI	340MB	\$1,900	\$2,100	\$2,200	\$2,300	\$2,800	\$3,400	\$3,800
	676MB	\$2,300	\$2,500	\$2,600	\$2,700	\$3,200	\$3,800	\$4,200
	1.2GB	\$2,900	\$3,100	\$3,200	\$3,300	\$3,800	\$4,400	\$4,800

*OEM versions manufactured by NEC.

Every System Includes

45-Day Money-Back Guarantee*

One-Year Parts And Labor Warranty

Free TRW On-Site Service In Most U.S. Locations**

Free Lifetime Toll-Free Technical Support

Free 24 Hour Bulletin Board Technical Support

48 Hour High-Temperature Burn-in

Novell, Unix, Xenix, & OS/2 compatible

Personal And Business Leasing Plans

All Major Credit Cards Accepted

CALL FOR \$1.00 SPECIALS!
800-456-1818

Open 6am-7pm Weekdays and 8am-4pm Saturdays (PST)
International 510-623-1212, 24 Hour Fax 510-623-0818

Government Systems Division
Call 800-456-8809
GSA# GS00K91AGS5107 - PS01



ACMA 386SX/25

- Intel386™ SX 25MHz
- 2MB RAM expandable to 16MB
- 1.2MB & 1.44MB floppy drives
- 6 16-bit & 2 8-bit expansion slots
- 2 serial, 1 parallel, & 1 game port
- Shadow RAM
- Math coprocessor socket
- 101-key keyboard
- DOS 5.0, Windows, & Glossary
- See chart for monitors & hard drives

Basic System \$699



ACMA 386/33

- Intel386™ 33MHz with 64K Cache
- 4MB RAM expandable to 64MB
- 1.2MB & 1.44MB floppy drives
- 1 32/16-bit, 5 16-bit, & 2 8-bit slots
- 2 serial, 1 parallel, & 1 game port
- Shadow RAM
- Math coprocessor socket
- 101-key keyboard
- DOS 5.0, Windows, & Glossary
- See chart for monitors & hard drives

Basic System \$899



ACMA 486/33

- Intel486™ 33MHz ISA or EISA
- Internal 487 coprocessor & 8K cache
- 4MB RAM (exp. to 32-ISA & 64 EISA)
- 256K secondary static RAM cache
- 1.2MB & 1.44MB floppy drives
- 8 expansion slots
- 2 serial, 1 parallel, & 1 game port
- Shadow RAM
- 101-key keyboard
- DOS 5.0, Windows, & Glossary
- See chart for monitors & hard drives

ISA \$1,299 • EISA \$1,799



ACMA 486/50i

- Intel486™ 50MHz CPU
- Internal 487 coprocessor & 8K cache
- 4MB RAM expandable to 32MB
- 256K secondary static RAM cache
- 1.2MB & 1.44MB floppy drives
- 7 16-bit & 1 8/32-bit expansion slots
- 2 serial, 1 parallel & 1 game port
- Shadow RAM
- 101-key keyboard
- DOS 5.0, Windows, & Glossary
- See chart for monitors & hard drives

Basic System \$1,699

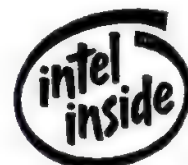


33MHz NOTEBOOK

- 386 33MHz CPU
- 4MB RAM expandable to 16MB
- 1.44MB floppy drive
- 100MB hard disk drive
- Math coprocessor socket
- VGA display w/ 32 gray scale levels
- 1 serial, & 1 parallel port
- Supports external monitor & keyboard
- 11" x 8.6" x 2"
- 7 pounds (9lbs with battery)
- Enhanced keyboard
- Carrying case, car adaptor, & charger
- Glossary software

\$2,299

COMPUTERS, INC.
Acma



© 1991, Acma Computers, Inc., 48501 Warm Springs Blvd., Fremont, CA 94539 All prices and specifications are subject to change without notice. *The 45-day money-back guarantee covers Acma brand computers with Impression Plus or Hyundai monitors only (software, printers, peripherals, and shipping are not included). **On-site service covers complete systems only (notebook not included). The Intel Inside Logo is a trademark of Intel Corporation.

Acma is not responsible for errors in typography or photography. Call today to confirm complete details.

CIRCLE 360 ON READER SERVICE CARD

Letters

BLUE BELIEVER

I can tell you one reason why I feel OS/2 will never replace Windows (William F. Zachmann's "Blue Believer: Why I Still Think OS/2 Is a Winner," February 25, 1992). Show me one developer's software package that I can purchase right now in roughly the same price range as Microsoft's Visual Basic or *Object-Vision* 2.0. Show me the *Actor* or *Tool-Book* packages. When is Borland going to include C for OS/2?

I would love to move into full 32-bit OS/2, but alas, Windows and Microsoft will take the day—unless the tools to utilize OS/2 become both popular and cheap real soon. When Zachmann can give me the tools, then I too can believe in OS/2. Until then, can someone help him get his head out of the sand?

David K. Miller

Virginia Beach, Virginia

The very real technical reasons why OS/2 is better than Windows have always been true. At our company we manipulate images and work day to day with the full-color world. We have Windows and OS/2 and software products worth thousands of dollars. Windows programs are slower, less reliable, and more difficult to use. OS/2 works well! Crash? Never.

Your editors called Zachmann a "contrarian columnist." Yes, he is just now, but the foresight he and a few others show is why I keep my subscription.

J. Barry Chalmers

Glasgow, Montana

Tell Zachmann to keep selling OS/2. Heavens knows IBM doesn't seem to want to do the job.

Todd Stockslager

Hagerstown, Maryland

DVORAK'S DEAD-END TRENDS

It's not often I actually agree with John C. Dvorak (though I always find his comments stimulating). In a recent column ("The Dead-end Trend," February



Our readers have mixed emotions when it comes to OS/2.

25, 1992) he identifies "oddball cheap high-speed modems using proprietary techniques" as a dead-end trend. Hallelujah! These modems are a dead issue, and their only market consists of the technologically ignorant. Alphabet soup (V.32, V.42, V.42bis) is where it's at. Get on-board, telecommunications!

Alan D. Bryant

Denver, Colorado

John is out of touch with reality again. To suggest that software vendors stop distributing 5.25-inch floppy disks completely ignores the tens of millions of computers with only those drives. While it is nice to have the latest hardware, older computers will still be useful into the next century for more mundane tasks—like writing this letter.

Leslie Thomas

Stephentown, New York

If Dvorak would like to donate about a dozen 386SX PCs and a thousand or so 3.5-inch floppy disks to our seniors group, we would gladly give up on the 5.25-inch floppies. If not, I'm afraid we will

be stuck using the older floppies for the rest of this decade.

K.A. Lane

Sacramento, California

PURSuing EXCELLENCE

Bruce Shumway's feeling that your objectivity is on a par with that of our politicians (Letters, February 25, 1992) was more correct than he probably realized. You answered his letter in true political fashion by sidestepping and blowing smoke on the issue.

The fact that MS-DOS 5.0 is a "significant (and compatible) upgrade" and also recovers 60K of conventional memory is a smoke screen. DR DOS 6.0 has these attributes. Mr. Shumway stated that technical excellence is not a popularity contest. You ignored that remark in your reply and instead stated that there are 2 million MS-DOS 5.0 users and that it remains the standard among operating systems (two facts that show popularity but not technical excellence).

The reason for making awards for technical excellence is to show where we can and should be going. MS-DOS 5.0 is a solid product that leads the market due to Microsoft's marketing advantage and reputation as the standard-setter. But DR DOS 6.0 has the technical edge.

Walter J. Turberville III

Phoenix, Arizona

I was disgusted at your mean and weak editorial reply. There is nothing in the reply that gives any reason to have replied! What does the phrase "significant (and compatible) upgrade" mean? Are you insinuating that DR DOS 6.0 is not compatible? Doesn't DR DOS 6.0 give more than 60K of memory back? What is it about MS-DOS 5.0 that is "technically excellent"? I would respect *PC Magazine* more if you renamed your annual awards to reflect what they really are: Selling Excellence Awards!

James A. Villela

Carson, California

LASERJET DEALS!

Save \$100!

There's simply no better word for IQ Engineering's Super Cartridge® 3/Creative Collection. Because no other LaserJet III cartridge offers so many imaginative, high-quality fonts for so little. In fact, you'll get 66 fully scalable text and display typefaces for just \$395 — that's a mere \$5.99 per typeface! Best of all, the Creative Collection supports Windows and your favorite software — making it ideal for networks — and it requires no printer memory. All of which makes printing faster and easier than ever. So call IQ Engineering today. And start making a sensation of your own.

IQ ENGINEERING

1-800-765-FONT

Super Cartridge, IQ Engineering and IQE are trademarks of IQ Engineering. Other company and product names may be registered trademarks of their respective holders and are acknowledged. © 1992 IQ Engineering. All rights reserved.

CIRCLE 325 ON READER SERVICE CARD

Letters

If you want to call the awards "Marketing Awards," then do so. If you want to have awards based on technology, then do so. Don't get the two mixed up.

By the way, where is *GeoWorks* in the technology list or anywhere else in your magazine? It's a great program that runs on just about any PC.

Jerry L. Rowe
Marion, Indiana



We certainly didn't mean to disparage DR DOS 6.0 in our response. As Mr. Shumway pointed out, we had discussed many of its advantages over MS-DOS 5.0 in our November 13, 1991, First Looks column. We did not nominate DR DOS 6.0 for a technical excellence award because many of its great features were introduced previously in DR DOS 5.0, which was a 1990 tech-ex nominee, as was the outstanding *GeoWorks Ensemble*.

Further, if these awards were given for marketing prowess, neither GO Corp.'s *PenPoint* (1991) nor Hewlett-Packard's *NewWave* (1990), would have emerged as winners.—Ed.



LOGITECH RESPONDS

It is with some concern that we read the letter from Jim Nollman in your February 11, 1992, Letters column. Apparently, Mr. Nollman has been misinformed: *Ansel* does indeed support *all* of Logitech's ScanMan scanners, as does *FotoTouch* (*Ansel's* successor).

It has always been Logitech's policy to fully support our customers by offering software upgrades for nominal fees. In the unusual case that a newer piece of software has not supported older hardware, we have offered hardware upgrades as well—something most other hardware manufacturers do not do.

Logitech's current upgrade policies can be obtained by calling the Logitech FaxBack system at 800-245-0000 and ordering Document #6500.

Michael W. Doyle
Technical Support Manager
Logitech Inc.
Fremont, California



AN ENGINEER'S DREAM

Many of us in the engineering field read your magazine and welcome the reviews of engineering-related software

and hardware. Based on your evaluation, I obtained *CADMagic* from Haestad Methods, and I couldn't be happier with the package. Please keep reviews of engineering hardware and software coming, and keep up the usual good work in the other areas as well.

John E. Bean
New Britain, Connecticut

Your February 11, 1992, issue was an engineer's answer to a prayer. In that single issue you managed to cover 486/33 workstation PCs, project management software, memory managers, wireless LANs, and *AutoCAD* utilities. You gave excellent coverage to some critical areas that engineers must address and act upon today.

Maybe in a future issue you could look at geographical information systems (GISes) in *AutoCAD* or mapping products on compact disks. This stuff is becoming more mainstream everyday.

Jack Cook, Jr.
Woodbury, Connecticut

CORRECTIONS & AMPLIFICATIONS

Memory managers are extremely sensitive to the specific configuration of the particular system on which they are tested. Because of this we reinvestigated our story "Nine Memory Managers Open Up New Frontiers" (*PC Magazine*, February 11, 1992), and we have the following corrections and amplifications to make.

In the suitability to task ratings, we underrated the MS-DOS 5.0 Upgrade Kit for the "Microsoft Windows support" task (page 248). It garnered a 2 (fair); it should have received a 3 (good).

In the EMS Context Switch performance test on page 238, the charts describe the control system as a system without a memory manager. In fact, it was loaded with Compaq DOS 5.0 and EMM-386.EXE. For the EGA/VGA Text-Mode Unscrolled BIOS Writes test on the same page, the results for *QEMM-386* both with and without Stealth enabled were reported incorrectly. Retesting proved that *QEMM-386* offered performance identical to *Netroom* and *386MAX*, but when Stealth was activated the

CONTINUES

Which data compression product?

Read what the experts have to say.

You probably *need* more disk space. Right? If you're running Windows® you *must have* more disk space. So now, the question isn't *whether* you need data compression, it's *which* data compression product? So listen to the experts.

The independent testing labs of NSTL, Inc., recently released the most in-depth and comprehensive study on data compression done to date. This 44-page report rates Stacker® highest in performance, versatility, ease of learning and ease of use. In fact, Stacker AT/16 and Stacker 2.0 software are the *only* products "recommended" by NSTL.

But that's to be expected for Stacker. After all, it's won just about every major award in the industry. Now who would you trust your data to?

So what are you waiting for? Your disk isn't getting any bigger while you sit there.

Get Your FREE Report Now!

If you're like most PC users, your data is worth more than your computer. So get all the facts before you choose a data compression product.

Call us now for your copy of the NSTL Report.

1-800-522-7822, ext. 6512

1-619-431-7474

Stac • 5993 Avenida Encinas • Carlsbad, CA 92008

STAC®

The Data Compression Company.

1992
Byte Magazine
Award of
Distinction

1992
PC Magazine
Editor's
Choice

1992
Windows
Magazine
WIN Award



1990
ByteWeek
Best of
COMDEX



1991
PC Computing
Most Valuable
Product



1991
PC Magazine
Technical
Excellence



Stacker is a trademark of Stac Electronics. Stac is a registered trademark of Stac Electronics. Software Digest and Ratings Report are registered trademarks of NSTL, Inc. Windows is a Trademark of Microsoft Corporation

© 1992, Stac Electronics

CIRCLE 061 ON READER SERVICE CARD



With
installations
from AutoCAD
Adventures in CAD
and more, we
are increasing the productivity of
Architects and Engineers on all levels
worldwide. TRI-CAD now provides all the
franchise owners of the world's
largest Authorized AutoCAD training
center — The CAD Institute. From
America's first franchise to the future, still,
our business CAD value is being realized
worldwide. We come highly recom-
mended in many languages.

TRI-CAD 486 33MHz ISA

Intel 80486 33MHz Processor with Integrated
8K Cache & 487 Math Coprocessor
8MB of High Speed 32-Bit RAM
(expandable to 32MB on-board)
64K of St 64K of Static RAM Cache to 256K)
210MB 15ms IDE Hard Drive with 64K Cache Buffer
1.2MB Teac 5.25-inch Floppy Disk Drive
1.44MB Teac 3.5-inch Floppy Disk Drive
S-3 1280x1024 72Hz 1MB 32,000 Color
N/I Graphics Adapter
TRI-CAD 17" 72Hz Flat Screen
Non-Interlaced Color SVGA Display
TRI-CAD 12"x12" Digi-Tab II with 16 Button Cursor
ACAD DLD Driver
Two Serial Ports & One Parallel Port
Microsoft DOS 5.0
TRI-STAR 101-Key Tactile Keyboard

NOW ONLY!
\$3695
LEASE \$135/MONTH

TRI-CAD 486 33MHz ISA+

Intel 80486 33MHz Processor with Integrated
8K Cache & 487 Math Coprocessor
8MB of High Speed 32-Bit RAM
(expandable to 64MB on-board)
64K of Static RAM Cache
340MB 15ms IDE Hard Drive with 64K Cache Buffer
1.2MB Teac 5.25-inch Floppy Disk Drive
1.44MB Teac 3.5-inch Floppy Disk Drive
S-3 1280x1024 72Hz 1MB 32,000 Color
N/I Graphics Adapter
TRI-CAD 17" 72Hz Flat Screen
Non-Interlaced Color SVGA Display
TRI-CAD 12"x12" Digi-Tab II with 16 Button Cursor
ACAD DLD Driver
Two Serial Ports & One Parallel Port
Microsoft DOS 5.0
TRI-STAR 101-Key Tactile Keyboard

NOW ONLY!
\$3995
LEASE \$142/MONTH

VIDEO UPGRADES

21" FLAT SCREEN 1280x1024
COLOR DISPLAY \$995
TI 34020 1280x1024
GRAPHICS ADAPTER \$995

TRI-CAD
486 50MHz ISA+
\$4395

What Daddy Never Told You About DOS Communications.



Crosstalk® Mark 4 has always been what *Lotus* magazine called, "The hands-down Big Daddy of DOS communications," but there were some things even *this* async "big daddy" never told you. Until now, not even Crosstalk Mark 4 said you could emulate terminals like the WYSE® 50/60 or the HP® Series.*

Well, the new version 2.1 says you can have these emulations and a lot more besides.

From DEC LAT To LAN Packs, Now Big Daddy Has It All!

There's DEC LAT support, so you can connect to a VAX® via Ethernet and bypass your terminal server. There's queue dialing. An enhanced host mode. And new CASL™ commands.

You can even get a network pack with LAN licensing for up to four concurrent users. If you have more than four people using Crosstalk Mark 4 at the same time, you just add more LAN packs. And watch the savings multiply.



Big Daddy, The Mother Of All Comm Packages.

Even before these latest achievements, the editors of *PC Magazine* chose Crosstalk Mark 4 as the top performer among all comm packages

CIRCLE 278 ON READER SERVICE CARD

“The hands-down Big Daddy of DOS communications packages.”

—*Lotus*, October 1991

for 1991, calling it "A top notch program that does almost everything and does it all right..." That's everything from VT™ emulations and ZMODEM to FTTERM and IND\$FILE. You get CASL, a powerful programming language like C or Pascal. Speeds up to 115,200bps. Multiple sessions. Modem sharing on LANs. Synchronous hardware support. The works!

Get Your Arms Around The Hands-Down Big Daddy.

To get a better grasp of Big Daddy, all you need to get is us on the phone! From the low-down on our upgrade pricing to details on our network pack, we'll give you all the help you want.

Just call 1-800-348-DCA-1, ext. 94A.**

CROSSTALK

Another Communications Solution From DCA®

72392A, 2396A, 2625A or 2624A ***call (604) 471-8380 if outside the U.S. © 1992 Digital Communications Associates, Inc. All rights reserved. DCA and Crosstalk are registered trademarks and CASL is a trademark of Digital Communications Associates, Inc. All other brand and product names are trademarks or registered trademarks of their respective owners. Reprinted from Lotus Magazine, October 1991.



April 1991
Crosstalk Mkt. 4



April 30, 1991
Crosstalk Mkt. 4 Version 2.0



Vol. 7 No. 12 1990
Crosstalk Mkt. 4



CORRECTIONS & AMPLIFICATIONS, CONTINUED

performance degraded significantly.

On page 212 we stated that *QEMM-386's* Stealth offers the most impressive memory gain. After further testing we conclude that this is only true for certain configurations.

On page 250, in a discussion of relocating BIOS to the high memory area (HMA), we said the memory gain could be as much as 27K. In fact, certain configurations allow you to recover more.

In our discussion of *Netroom's* DOS Shell compatibility (page 252), we stated that the software was susceptible to crashes. When we tested the Compaq DOS 5.0 Shell with *Netroom* on our test-bed Deskpro 386/25Ms at PC Magazine Labs, we found no problems. Again, this depends on the specific system and configuration.

We also stated that *Netroom's* Quantum feature was incompatible with *FRAC*, a shareware game. In fact, if you run Quantum and relocate your ROM to HMA, it autoloads the kernel into an area of the upper memory block (UMB) that *FRAC* can't deal with. You can configure Quantum to eliminate this incompatibility.

On page 252 we stated that we had found two errors in *Netroom's* implementation of the extended memory specification (XMS). Subsequent testing, using Microsoft's program for testing compliance to XMS, found that *Netroom* fails to comply with the specification completely when you relocate or compress the BIOS. It should be noted that our Editors' Choices, *QEMM-386* and *386MAX*, also exhibit noncompliance under these conditions. Whenever you try to relocate or compress the BIOS, you may come up with errors on the XMS test for compliance. We have not been able to translate this noncompliance to any real-world incompatibilities.

A photo caption on page 219 implies that *Netroom's* Discover utility is not as complete as other packages. Overall, Discover reports with the same level of detail as the competing utilities.

In the features table on pages 224

to 229, we incorrectly state that the MS-DOS 5.0 Upgrade has an automatic LOADHIGH command. It does not. Furthermore, the question "compatible with MS Windows in Standard mode" for the MS-DOS 5.0 Upgrade Kit should be answered no. You cannot run Windows in Standard mode with DOS 5.0 when you use the EMM386.EXE memory manager.

In our review of Panasonic's KX-P1124i and KX-P2624 printers in our November 26, 1991, issue, the Letter Quality speed results we published were Super Letter Quality results; under Panasonic's LQ mode, the printers would run roughly twice as fast. The KX-P1123's serial-interface option that costs \$69.95 handles up to 9,600 bits per second, while the serial interface costing \$109.95 operates at 19,200 bps.

In "19 Programs That Build on AutoCAD," February 11, 1992, we should have stated that the next version of *SirlinVIEW Plus* (Version 2.0) will provide features singled out for criticism in our review: 3-D rendering of drawings in *AutoCAD*, Releases 9, 10, and 11; support for XREFs and Paper Space; interactive creation of hyperlink files from within the program; and directory selection from the Load Drawing dialog box.

In the February 11, 1992, New & Improved column, we should have said that BSE Co.'s disk controller software for its Flashdrive external portable storage units occupies 2K of system RAM, not 15K.

HOW TO WRITE TO PC MAGAZINE

We welcome your comments, complaints, insights, and suggestions. Please send them to Letters, *PC Magazine*, One Park Avenue, New York, NY 10016, or upload them to PC MagNet (see page 10 for access information). All letters become the property of *PC Magazine* and are subject to editing.

TrueType[®] on the *IIIP*[™]

JetType IIP

puts 13+ TrueType scalable faces in your LaserJet IIP, all from a standard cartridge. JetType IIP is designed to run transparently with Windows 3.1, eliminating the need for font downloading or additional memory. JetType IIP offers 13 TrueType faces: Times New Roman, Arial & Garamond in Med, Bold, Italic, and Bold Italic, Script and Symbol, plus 4 Lotus spreadsheet fonts; with the type quality you expect from JetWare.

JetType[™]



JETWARE[™] by Computer Peripherals, Inc.
667 Rancho Conejo Blvd. • Newbury Park CA
805-499-5751 Netherlands: 31-43-65-01-00
TrueType is a registered trademark of Apple Computer, type face names, of MonoType Corp;
LaserJet IIP is a trademark of Hewlett Packard Co.

ZEOS[®] Notebooks

Now's the time to get your own



from \$1295!

ZEOS Notebook!

"THE HOTTEST DEAL ON THE NOTEBOOK MARKET"—PC MAGAZINE



PC Magazine's Editors' Choice, PC World's Best Buy, Computer Shopper readers' Best Buy of 1991, the praises go on and on. "Sensational...best price performer...astonishing value...a steal...the

number one contender..." The experts love it. And you're sure to love it too, particularly at these great new prices!

Pick your power. Choose our 286-12 for only \$1295 or move right up to the incredible 386SX-16 for only \$1495. Whichever you decide, you've got the hottest Notebook deal going at any price!

INCREDIBLE DESKTOP FEATURES IN A NOTEBOOK!

Owning your new ZEOS Notebook is really like owning a fully featured desktop that you can take with you anywhere. Complete with a 20 megabyte hard drive standard (with a 60MB option), 1.44 floppy disk drive and crisp 10" VGA display, there is nothing else like it at anywhere near the price.

Speaking of your display. It's the ultimate in sparkling clarity featuring advanced fluorescent backlighting for truly vivid VGA graphics. Larger than many others, this is the one display you'll truly enjoy using.

DETAILS MAKE THE DIFFERENCE!

For instance, you will really appreciate your new Notebook's advanced battery system with our snap-in, snap-out battery packs. They're so light and easy to use you can easily take an extra one with you

on those really long trips. Hour upon hour of Notebook computing power!

CONNECTIVITY TOOL!

Your new ZEOS Notebook is a great connectivity tool. Utilizing our optional built-in MNP® Class 5 send/receive fax modem, you can transfer data or send and receive faxes any time you're connected!

And speaking of connectivity, we've kept the I/O easy to use too. Because unlike

many of the others, your new ZEOS notebook has the same industry standard port connectors you'll find on your larger desktop system. Serial and parallel ports; even an external VGA connector. Completely compatible!

ZEOS 24 HOUR A DAY SUPPORT.

Don't forget your new ZEOS notebook is backed by the best Technical and Sales support in the industry, 24 Hours a Day.

We're always here to help, *anytime* of the day or night. And we don't stop there either.

Your new notebook is also backed by our 30-Day Absolute Satisfaction Money-Back Guarantee and One Full Year Limited Warranty. You're going to be very satisfied. We don't just say it. *We guarantee it.*

ORDER YOUR OWN ZEOS NOTEBOOK NOW!

You can order your own ZEOS Notebook *right now*. Simply pick up the phone and give us a call now at 800-423-5891. Larger hard drives, carrying cases and more are also available! At last, a full featured notebook that lets you compute anywhere. You're going to love it!

ORDER NOW TOLL FREE:
800-423-5891

Purchase Orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs are available. All prices and specifications are subject to change without notice. Please call to confirm pricing, specifications and warranty details. The following are trademarks of their respective companies: ZEOS (ZEOS International, Ltd.), MNP (Microcom Systems, Inc.); © 1992, ZEOS International, Ltd., 530 5th Avenue, N.W., St. Paul, MN 55112 USA. ZEOS is a publicly traded company (NASDAQ symbol: ZEOS).

CIRCLE 035 ON READER SERVICE CARD

NOW. YOUR COMPLETE ZEOS NOTEBOOK! VGA, HARD DRIVE, FLOPPY DRIVE AND MORE!

'286-12 ONLY \$1295

'386SX-16 ONLY \$1495

- '286-12 or '386SX-16.
- 1MB DRAM, expandable to 3 or 5MB.
- 20MB High Speed HDD, 60MB optional!
- Built in High Density 3.5" 1.44MB floppy drive.
- High Resolution VGA display. Fluorescent backlight 640x480, 32 grey scales. Bright and clear!
- Removable quick charge NiCad battery. 2.5 hour plus battery life typical, more using Programmable Power Management!
- Quick charge or trickle charge using included AC power adapter.
- Extra battery packs and external charging stand available.
- 82 key keyboard. True 101 key emulation.
- Industry standard Serial and Parallel Ports.
- VGA port for external VGA color display. Great for demos!
- Total system weight seven pounds with battery!
- 30 Day Absolute Satisfaction Money Back Guarantee and ZEOS Customer Satisfaction Package.
- One Full Year Limited Warranty.
- 24 Hour a Day Toll Free Technical Support, 365 Days a Year.

ORDER NOW TOLL FREE

800-423-5891

FAX Orders: 612-633-1325

Minnesota: 612-633-4591

Hearing Impaired (TDD)

Orders: 800-228-5389

Outside US and Canada:

612-633-6131

MasterCard, VISA, Discover

Am Exp. Z-CARD, COD and

leasing programs.

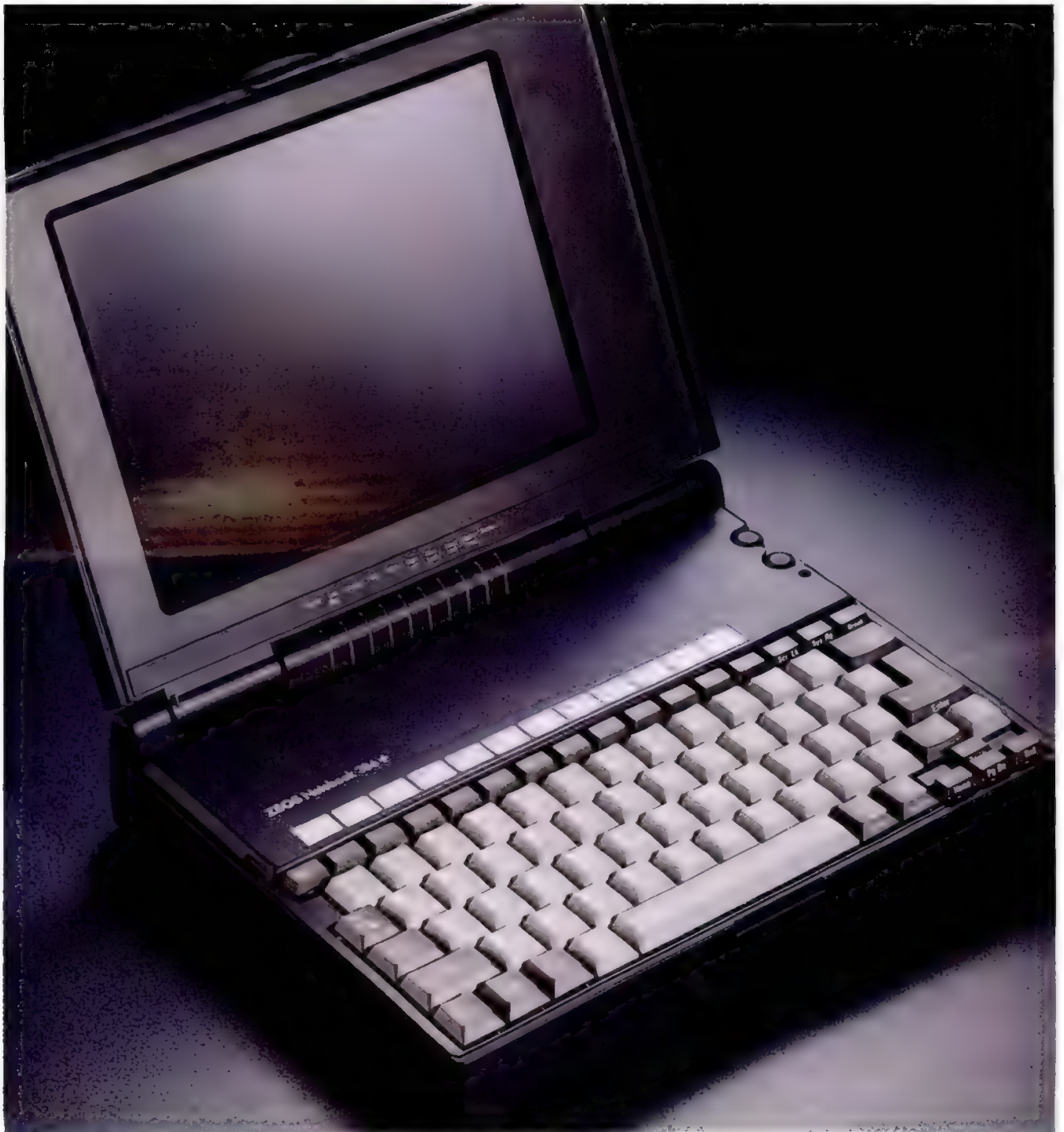
Open 24 Hours a Day,

365 Days a Year!



Now. The *New* ZEOS[®]

The Hottest Deal is



Notebook 386+! now even Hotter!

STARTING AT ONLY \$1795!

From *PC Magazine's* Editors' Choice to *Computer Shopper* readers' Best Buy of 1991... The original ZEOS Notebook was perhaps the most awarded notebook in the world. So how could we make the best even better?

SMALLER. LIGHTER. MORE VALUE!

We've made our new ZEOS Notebook 386+ slimmer, trimmer, packed in some great new features and kept the great price—only \$1795. Check it out!

We know portability is important to you. So we've cut a couple inches off the sides and a half pound off the weight. At a convenient 8½ x 11" and a slimmer 6.6 pounds (including the battery) it fits right into your briefcase!

More memory, lots of power. Your new Notebook starts with a '386SX CPU and offers 2, 4 or 8MB of RAM. Plenty of power and plenty of room for all the memory you need.

Versatile. Use it as a Notebook—or set it up as a desktop! In addition to the standard parallel, serial and VGA ports, we've added ports for an external full-size keyboard and for a mouse.

Longer battery life. In addition to programmable power-saving features, we've added "Suspend and Resume," so you can put your computer "in suspense" if you pause while working. Now you can extend your battery life—which is typically 3 to 4 hours—to last even longer!

Incredibly durable. In a recent "torture test" by *PC Computing*, the ZEOS Notebook was dropped, bumped, spilled on, and subject to extreme heat and cold. It survived unscathed. And your new 386+ has the same toughness built in from the ground up!

Faster and easier than ever to upgrade. More memory and a math coprocessor are

easy to add. The new 386+ design allows you to install these options any time you're ready!

MORE OF THE GOOD STUFF, TOO.

Even though your new Notebook is smaller than ever, it still offers the same, crisp 10" VGA display. The ultimate in sparkling clarity, it features advanced fluorescent back-lighting for vivid VGA graphics.

And you'll still get our whisper-quiet high-speed, high-capacity hard disk drive—and a built-in, industry standard 1.44 MB, 3.5 inch floppy drive. There are more advanced features, too.

For instance, the battery system of your new Notebook is the most advanced on the market. You can quick-charge or trickle-charge any time your system is plugged in. And you're sure to appreciate our snap-in, snap-out battery packs. They're so light and easy to use, you

can easily take one with you when you travel. *Hour upon hour of Notebook computer power!*

SAME GREAT ZEOS 24-HOUR-A-DAY SUPPORT.

And remember, your new Notebook is backed by the best Technical and Sales support in the industry, *24 hours a day, 365 days a year.* Any time you need us, your telephone is a toll-free hotline—direct to ZEOS. You also get our 30-Day Absolute Satisfaction Money-Back Guarantee and One Full Year Limited Warranty.

ORDER YOUR OWN 386+ RIGHT NOW!

The new ZEOS Notebook 386+ is just what you've been looking for. Smaller. Lighter. More power and memory. All at an astounding price! You're going to be very satisfied. *We guarantee it!*

ORDER NOW TOLL FREE:
800-423-5891

THE NEW ZEOS
NOTEBOOK 386+.
ALL THIS STARTING
AT ONLY \$1795!

- '386SX CPU.
- 2MB RAM standard, expandable to 4 or 8MB!
- 20MB high-speed IDE hard drive; larger available.
- Built-in high density Teac 3.5" 1.44MB floppy drive.
- High-res VGA 640x480 backlit LCD display, 32 shades of grey. Bright and clear!
- Removable quick-charge NiCad battery. 3 to 4 hours of battery life typical, more with power-saving features!
- One hour quick-charge or trickle-charge. Extra battery packs available.
- 79-key keyboard with embedded numeric keypad, 12 dedicated function keys, and true 101-key emulation.
- Serial, parallel, external keyboard, mouse and external video ports. Use your Notebook as a desk top tool!
- Total system weighs only 6.6 pounds with battery!
- 30-Day Absolute Satisfaction Money-Back Guarantee and ZEOS Customer Satisfaction Package.
- One Full Year Limited Warranty.
- 24-Hour-a-Day Toll-Free Technical Support, 365 Days a Year.

Make your new Notebook the ultimate travelling companion. We can add more memory, a larger hard drive, custom-fitted carrying case, extra battery, internal send/receive fax modem. Ask about our money-saving packages, too!

ORDER NOW TOLL FREE
800-423-5891

Fax Orders: 612-633-1325

Gov't: 800-245-2449

GSA# GS00K91AGS5179

Outside U.S. & Canada:

612-633-6131

Hearing Impaired (TDD):

800-228-5389

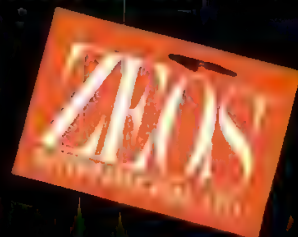
MasterCard, VISA, Discover,

American Express, Z-CARD,

COD and Leasing Programs.

Open 24 Hours a Day,

365 Days a Year!



Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs are available. All prices and specifications are subject to change without notice. Please call to confirm pricing, specifications and warranty details. The following are trademarks of their respective companies: ZEOS (ZEOS International, Ltd.), © 1992, ZEOS International, Ltd., 530 5th Avenue, N.W., St. Paul, MN 55112 USA. ZEOS is a publicly traded company (NASDAQ symbol: ZEOS). TM2P-2/4

REMOTE WINDOWS SHOULD BE FASTER THAN TAKING THE STAIRS.

So, step up to the new Norton pcANYWHERE 4.5.*
The fastest, complete solution for both Windows® and DOS® remote control.

Until now, accessing remote PCs running Windows has been an exercise in frustration. That



The master of data recovery presents several breakthroughs in remote control.

was before pcANYWHERE 4.5, the newest version of pcANYWHERE's powerful technology. Now you can have complete

remote control of any Windows or DOS application from any PC — across a network, or PC to PC via modem. And you'll get full mouse support, even in DOS.

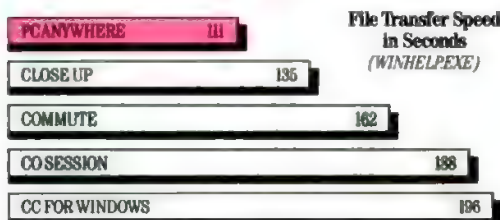
So fast, you may not know you're computing from afar.

pcANYWHERE's advanced data compression technology makes the most of your communications links. It runs so fast, it's almost like being there, even when you're re-sorting large databases or re-calculating spreadsheets. File transfers are just as fast — up to 115,200 bps.

pcANYWHERE 4.5 for LAN allows users to load and run applications,



transfer files, and even print remotely. A gateway runs in the background, permitting transparent access to the LAN from remote locations.



pcANYWHERE 4.5 outperforms the competition. It's so fast, you may not know you're computing from afar.

Always the most reliable. Now, even more so.

Speed alone doesn't mean much if your remote session crashes. pcANYWHERE uses sophisticated error correction technology to keep you on-line, even with a bad connection. Its full range of protocols and features make it compatible with all major hardware and software configurations.

All this control is yours at just \$179 for pcANYWHERE, and \$495 for pcANYWHERE LAN. To upgrade, it's \$59 for single and \$159 for LAN users.* Just call **1-800-343-4714 ext. 752** or **1-408-252-3570** to order. So why take the stairs? The phone's right in front of you.

WHAT'S NEW

- Remote control of Windows from DOS
- Quick Connect
- 13 new terminal emulations (15 total)
- 8 file transfer protocols
- Script language
- Ethernet & Token Ring support
- IPX & NetBIOS Transport support



SYMANTEC.

Trends

Trends & Technology Shaping the Personal Computer Market

PCs with On-Board Networking

Personal computers with on-board network support are finally beginning to show up, and some will debut as early as April's Spring Comdex in Chicago. Zenith Data Systems (ZDS) is likely to be the first vendor, delivering plug-and-play network access in its new line of 386SL notebooks. Most vendors are targeting 486-based business workstations and high-performance notebooks for built-in network access, according to Intel. But network support could find its way into a wide range of desktop and portable systems by the end of this year.

The first crop of PCs will support Ethernet—at no noticeable cost to the end user. Systems with support for both Ethernet and Token-Ring protocols should arrive by midyear, says Texas Instruments, which recently announced a dual-protocol chip. System vendors say that Token-Ring is more expensive to implement than Ethernet, but Texas Instruments says that its chips, priced at \$58 each in lots of 10,000 (compared with \$30 for Intel's Ethernet chip plus analog components and connectors) will not significantly add to the total cost of a PC.

TI says users want both protocols supported; a Gartner Group survey of Fortune 500 companies found that over 70 percent have a mix of Ethernet and Token-Ring installed. But, Intel points out, Token-Ring has only half the market share of Ethernet and has stopped growing.

ZDS's new Z-NOTE 386SL-based notebooks will include on-board support for Ethernet and



preinstalled client shells for leading network environments, such as *NetWare*. Preinstalling client shells on the hard disk should eliminate installation headaches for end users.

—Mary Kathleen Flynn

Linear Addressing to Boost Video

Add a new term to the continuing struggle for better video performance: linear addressing. In a universe already cluttered with such spiky phrases as *graphics accelerators*, *local-bus video*, and *video on the motherboard*, linear addressing promises to deliver another big boost to systems straining under the load of graphically driven computing.

The video memory architecture we use today was designed for the 16-bit Real-mode 8088, which can only handle chunks (or pages) of video memory of 64K or less. But today's graphics adapters come with 1 to 4 megabytes of video memory, and accessing all that memory as a single flat address space is what gets video gurus excited.

Linear addressing puts video memory above the 1MB boundary and makes it directly accessible so there's no maximum

page size to worry about. Until recently, the 64K page limit was not a major problem. But as users add more colors and move to higher screen resolutions, it becomes a significant bottleneck. Since today's 32-bit processors can handle a linear video-memory model, it makes sense.

Several video boards already support linear addressing: Chips and Technologies, IBM's XGA, the S3 accelerator chip (in boards such as Orchid's Fahrenheit 1280°), the Tseng ET4000, TrueVision's Targa board, and Western Digital's new Paradise Accelerator.

Very little of today's software is capable of taking advantage of linear addressing, but that is changing. Microsoft has been advocating hardware acceleration of graphics functions (such as BitBlt) for over a year, but the software house has also been promoting a linear addressable video-memory model to boost Windows. Later this year, we should see Windows drivers that can address video memory directly, which is expected to improve performance by 10 to 15 percent.

—Mary Kathleen Flynn

The Right Mouse Button Lives!

Click on the left mouse button in any Windows application and you select an item or execute a command. But click on the right button and you're never sure what—if anything—is happening. Unlike the Macin-

tosh's single-button mouse, the Microsoft mouse has had two buttons ever since it was launched, but there's never been a standard use for that right button.

Rodent uncertainty may finally be at an end. Borland, Lotus, and Microsoft have all promised to use the right mouse button the same way: to bring menus up to the screen.

That's a click in the "right" direction, but this small gesture raises other questions for software developers. Once you decide to pop up a menu, which menu should you see? In *ObjectVision*, Version 2.0, and the forthcoming *Quattro Pro for Windows (QPW)*, Borland's answer is to have a "property



In *Quattro Pro for Windows*, the right button calls up a "property inspector."

inspector" pop up when you click on an object. Each object in the application has specific properties that can be manipulated directly from the instant menu. For example, a spreadsheet cell in *QPW* has characteristics like numeric format, alignment, font, and color that can be set from the instant menu.

Microsoft decided to add shortcut menus to the right mouse button in its upcoming *Excel 4.0* after the company did a study to see what commands were used most often. *Excel 4.0* will have

Windows Drivers to Get Virtual Education



For years, most people have thought of device drivers as a necessary evil. They were installed automatically by software, and the only time you even thought about them was when you didn't have the drivers you needed to make your hardware and software work together. With the release of Windows 3.1, drivers will start to develop a higher profile. And they'll get faster.

Mediocre device drivers can make a perfectly good piece of hardware run way below its top speed. A driver that makes optimal use of the operating environment can facilitate an immediate improvement in the access speed of a disk or the screen updates of a video board. Since better drivers are one of the few ways that Windows' performance can be improved, Microsoft is now putting some effort into helping hardware developers get the most out of their drivers. In Windows 3.1, Microsoft has overhauled the hard disk driver. Windows 3.0 introduced the Virtual Device Layer, which allowed multitasking DOS apps to run under Windows. But device drivers had to go through the Virtual Device Layer to redirect all requests for disk information to the system's BIOS.

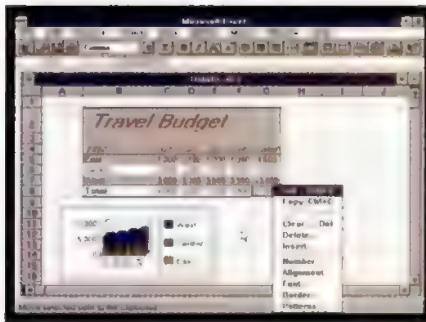
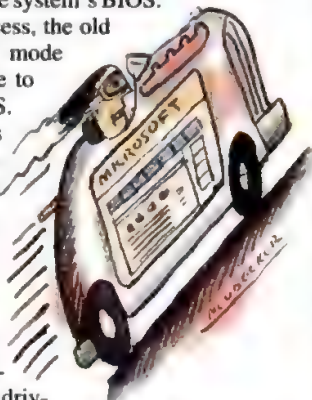
In addition to being a two-step process, the old way required frequent processor mode changes—from 386 Protected mode to Real mode—in order to read the BIOS. With Windows 3.1, Microsoft is beginning to take advantage of the Virtual Device Layer. Called FastDisk, the new driver runs completely in 32-bit Protected mode in the Virtual Device Layer instead of going through the 16-bit Real mode BIOS.

Now that Microsoft has realized this gain, the company is urging hardware vendors to write virtual device drivers (VxDs). Microsoft predicts that converting an existing driver to a VxD driver will take a substantial amount of programming time, which is why the software giant has gotten involved in hardware hand-holding. The biggest benefit from creating a VxD will be reaped by communications and storage devices. But there are other improvements device drivers can make: Microsoft advises video board makers to put the BitBlt function in hardware and polish up their BitBlt routines.

Since Super VGA boards have standardized around the VESA spec, it's become possible for Panacea to put WinSpeed, an enhanced Super VGA driver for Windows, on the market. But even here the hardware presents limitations; WinSpeed works only with Super VGA boards based on chip sets from ATI, Trident, Tseng (ET4000), and Western Digital/Paradise.

The only step you can take to improve your current drivers is to ask the vendor if an upgrade has been made. And when shopping for communications and storage devices, ask whether or not the Windows drivers are VxDs. ■

Gus Venditto is a contributing editor to PC Magazine and the editor of PC Sources magazine.



In Excel 4.0, the right mouse button brings up a context-sensitive menu.

context-sensitive menus that pop up depending on whether you select a cell, chart, workbook, toolbar, or graphic. And every Excel shortcut menu will start with the most widely used commands: cut, copy, and paste.

Borland introduced the term *menus on demand*, and *info boxes* are expected in the next major revision of 1-2-3 for Windows. But where Borland pops up a dialog box to present options, Lotus will take a "modeless" approach, which lets you directly manipulate an object and make changes without an OK/Exit dialog box. Lotus plans the same functionality for future versions of *Ami Pro* and *Freelance*.

Right-button conformity may take years to achieve, but the issue has picked up momentum as more PC users turn to graphical user interfaces and mice. IBM's OS/2 2.0 uses the right mouse button in the Workplace Shell to pop up menus. And many developers, such as Aldus and Computer Associates, which currently use the right button for proprietary commands, say they are willing to consider new uses.

—Christopher Barr

Halftone Images to Improve

Laser printer vendors are using an approach similar to Hewlett-Packard's Resolution Enhancement Technology (RET) to improve the quality of halftone (also called gray-scale) images. By producing more shades of gray on printers, the vendors will make halftones look as if they were printed at a higher

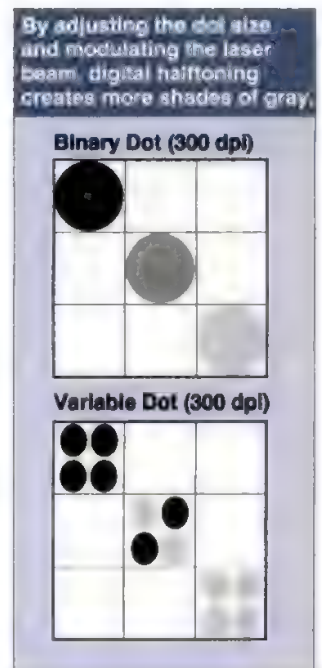
resolution, even at 300 dots per inch.

HP's RET revolutionized text printing two years ago when it debuted in the HP LaserJet III. By shrinking the dot size and modulating the laser beam, HP delivered cleaner, crisper text than ever before. Since then, HP's competitors,

such as Brother and IBM/Lexmark, have copied the technique. But while RET and its clones do wonders for text and line art (which want smoothing), they don't do anything for photographic images (which want sharpening). So now vendors are using the same approach—smaller dots and shorter "on" periods for the laser beam—to enhance halftones.

Last fall, Acer introduced the Acer Laser IIIG, which produces 256 shades of gray. And Apple brought out the LaserWriter IIG, which included PhotoGrade, an RET-like technology for halftones that yields 67 shades of gray for simulated 800-dot-per-inch images.

LaserMaster's new Turbo Gray technology, which should show up in products later this year, produces simulated 800-



by 800-dpi graphics with 256 shades of gray.

Several new add-in boards for LaserJet users offer improved halftone images. Xante Corp. recently brought out a \$1,695 board that delivers 600-dpi text output and simulated 850-dpi halftone images with 197 shades of gray (800-926-8839). XLI Corp. sells a \$1,495 board for Windows that delivers simulated 2,400-dpi images with 256 shades of gray; a version that includes true 1,200-dpi text costs \$1,950 (617-932-9199).

Destiny, which is second only to Hewlett-Packard in the laser controller market, is expected to move its Engine Enhancement Technology (which works with text and line art) to halftone images by midyear. Laser printers that use the technology should show up this fall.

—Mary Kathleen Flynn

New Life for Passive-Matrix Panels

In the color LCD wars, it seemed that slow passive-matrix screens were destined for inexpensive, lower-quality portable computer systems, while faster and brighter active-matrix screens would dominate the high end of the market. But a new technology called "active addressing" may give passive panels the boost they need to compete with active-matrix screens.

In Focus Systems, a Tualatin, Oregon, maker of LCD projection panels, has developed an active addressing algorithm that turns individual pixels on and off on an LCD screen, an improvement over the traditional passive-matrix method of switching an entire row of pixels on and off at a time. Active addressing will make the passive-matrix LCD screens faster and will eliminate crosstalk, which is an effect that causes a mouse cursor to disappear when you move it.

Active-matrix LCD panels require a transistor at each pixel to turn it on and off, and they generally cost three to four times more to manufacture than passive-matrix panels, which are

controlled by integrated circuits along their edges. In Focus says its technology uses drivers along the edges of the panel to send pulses that control individual pixels instead of an entire row.

A prototype In Focus panel has a 30:1 contrast ratio and a response time of 50 milliseconds, a sharp improvement over current passive-matrix LCDs. The company expects improved speed and contrast as it refines its product. Active-matrix panels are still more vivid with a 70:1-plus contrast ratio, but In Focus says its method should produce higher yields and make its panels considerably cheaper than active-matrix panels. They should also be fast enough to display video, a matter of some importance with the advent of multimedia.

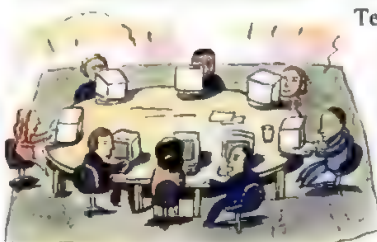
In Focus won't ship an LCD panel using active addressing until 1993, and its first product will probably be in a projection system. Direct-view panels will follow, and panels for notebooks will be made under license to a Japanese screen manufacturer.

—Christopher Barr

Meetings Go Electronic, for A Price

Will we ever stamp out meetings? Not likely, but several vendors say they can make your meetings shorter, less frequent, and more productive with software products that use networked computers as communicators. These groupware system manufacturers claim to make face-to-face meetings faster and less painful, and even let you hold "virtual meetings," with participants joining from their offices when schedules permit.

The companies have taken different approaches to the same problem, but they all require a LAN and allow simultaneous



sharing of information for more efficient collaboration. Most provide tools to generate, organize, evaluate, and vote on ideas, while creating a detailed record of the meeting process. So far, these products are expensive—most are between \$3,000 and \$50,000. These products are being pitched to large companies that regularly hold meetings of more than 20 employees, and companies such as software developers that do a lot of group brainstorming.

GroupSystems, from Ventana Corp. (Tucson, Arizona; 612-325-8228), is primarily designed for face-to-face meetings, where participants sit around a horseshoe-shaped table typing away at their keyboards while a leader guides them through the decision-making process. The system, which is priced at \$24,900 for a 20-user license with a basic toolset, can also be used for anytime, anyplace follow-up meetings.

OptionFinder, from Option Technologies (Mendota Heights, Minnesota; 612-450-1700), is designed for same time, same place meetings guided by a leader. The big difference is that *OptionFinder* provides no brainstorming capabilities. You have to do your brainstorming manually, then use *OptionFinder* to structure and vote on ideas. Voting is done via hand-held electronic keypads, with questions and answers projected on a large screen. The fully portable system costs \$11,800 including software, 16 wired keypads, and peripherals.

TeamFocus from IBM, *VisionQuest* from Collaborative Technologies Corp. (Austin, Texas; 512-794-8858), and *OptionFinder Comments* from Option Technologies all work as unguided same time, same place or anytime, anyplace systems. All three products provide the full range of meeting tools; the differences are in the im-

Top 15 Software Sellers at Retail		
Current ranking		Last Issue
1	QEMM-386 6.0 Quarterdeck Office Systems	5
2	Microsoft DOS 5.0 Upgrade Kit Microsoft Corp.	1
3	Stacker 2.0 Stac Electronics	6
4	Quicken 5.0 Intuit	4
5	ProComm Plus 2.0 Datastorm Technologies	9
6	The Norton AntiVirus for Windows 2.0 Symantec Corp.	8
7	WordPerfect 5.1 for DOS WordPerfect Corp.	3
8	Microsoft Windows 3.0 Microsoft Corp.	7
9	The Norton Utilities 6.01 Symantec Corp.	11
10	Word for Windows 2.0 Upgrade Kit Microsoft Corp.	—
11	DR DOS 6.0 Digital Research	14
12	Quicken for Windows Intuit	12
13	Turbo Tax Personal 1040 ChipSoft	2
14	Norton AntiVirus Michelangelo Symantec Corp.	—
15	Word for Windows 2.0 Microsoft Corp.	—

The list ranks PC business programs according to the total number of copies shipped to stores and resellers in the week ending March 7, 1992. The list is based on shipments to more than 12,000 retail locations. It does not include sales made directly by software publishers and cannot be interpreted as a picture of the entire software market.

Sales information compiled by Ingram-Micro.

plementation of the tools. *TeamFocus*, which can run on a variety of platforms, costs \$50,000 for a 24-user license, making it the highest priced product in the category. *VisionQuest* is priced at \$32,000 for a 25-user system including system support and hand-holding. *OptionFinder Comments*, at \$3,000 for a 10-user license or \$5,250 for 25 users, is the lowest priced of the electronic meeting systems.

But even at the low end of the spectrum, the high prices of these systems may make you appreciate the traditional low-tech meeting. —Gayle C. Ehrenman

BRIEFS

■ "You can't put service and support on the motherboard," says Geof Karlin, marketing vp for SMC, about the trend toward on-board networking. SMC has a vested interest in keeping networking off the system board; with its acquisition of Western Digital's LAN business unit, the Hauppauge, N.Y., company is tied with 3Com for first place in the Ethernet adapter market. Karlin insists PC vendors "just don't know what they're getting into." But Zenith Data Systems (ZDS), likely the first to deliver PCs with on-board networking, isn't scared off by SMC's sales of 6,000 support calls each month. "We're confident our existing programs can handle the service and support issues," says marketing vp Dan Rosensteel.

■ **Be Your Own Broker:** FNN, Prodigy, and Quotron can give you reasonably current stock quotes, but they can't let you place an order and they can't give you information about your portfolio. *Fidelity On-line Xpress*, by Fidelity Investments Inc. and MECA Software, gives PC users 24-hour access to Fidelity's mainframe to get real-time quotes, check up on their stocks, and place orders. The package costs \$89.95 and customers save 10 percent off commissions, with no monthly fees or on-line charges (800-544-0246).

■ **Local Bus Wars:** As the largest supplier of VGA chips to PC makers, Western Digital may be in a good position to establish the de facto standard for implementing local-bus video. This summer, the company expects to deliver video chips optimized for local-bus operation. Two proposals are already on the table for a standard way to give peripherals, like video controllers, access to the local (or system) bus, which is much faster than the I/O bus. One comes from the Video Electronics Standards Association (VESA), the other from chip maker Intel.

—Mary Kathleen Flynn

OS/2 Apps: Waiting for Godot?

There may be more than a thousand OS/2 2.0 applications, but you've probably only heard of a handful of them. Most of the big software houses are reluctant to divert precious funds and programming resources away from the hot market for Windows apps. After all, they'll run under OS/2 anyway. This reluctance is widespread—even as the heads of some of these companies claim they would kill to loosen Microsoft's grip on the industry.

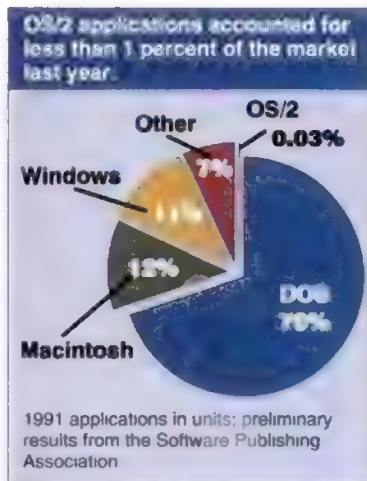
Borland was one of the first major software vendors to support OS/2 2.0 publicly. The company announced a version of *Borland C++* and *ObjectVision* for OS/2. But Borland is "bootstrapping with *ObjectVision*," according to a Borland official. The company has not decided whether to devote additional development dollars to converting its bread-and-butter applications, such as *Paradox*, *dBASE*, and *Quattro Pro*, to OS/2.

Lotus executives Jim Manzi and John Landry are evasive about exactly when any Lotus apps will be optimized for OS/2 2.0, though they say products are in the works. The likely first candidates are *Lotus 1-2-3* and *Freelance*, which should get 32-bit versions this summer.

Computer Associates, second only to Microsoft in the number of retail Windows applications on the market, plans to write for OS/2 2.0, but primarily in vertical programs like database servers and applications that connect micros to mainframes. According to Anders Vinberg, senior vice president of research and development, "OS/2 2.0 is a more robust development environment, but there is not a compelling desktop retail demand."

Even Paul Grayson, chairman and CEO of Micrografx, is cautious. Micrografx is developing the OS/2 graphics kernel in partnership with IBM and will soon

ship *PM Draw*, a port of *Windows Draw*. "It was easy to make the port, but it's a lot more expensive to market and advertise a product than to port it," he says. Although Micrografx announced plans to bring *Charisma*, *Designer*, and *Picture Publisher* to OS/2, this may not happen anytime soon. Says Grayson, "If OS/2 takes off, we'll commit



more funds. But if it's a slow burn, we'll concentrate on a single application."

You'll know OS/2 2.0 is a success when Microsoft begins developing OS/2 2.0 applications. When CEO Bill Gates was asked what it would take for Microsoft to write for OS/2, he said 2 million copies of OS/2 sold in the first year—"but they'll sell less than 10 percent of that."—Christopher Barr

CD-ROM Publishing Gets Better

Erased CD-ROM may still be three to five years away, but in the meantime, new write-once recorders from JVC and Philips cost half as much as those introduced by Sony and Yamaha last year. This year's products promise faster recording speeds, lower media prices, and, most important, the ability to record over multiple sessions. These capabilities—and the low prices—make CD-ROM an increasingly attractive medium for commercial and even low-volume corporate publishers.

A year ago, Sony and Yamaha

were the only companies making CD-ROM recorders, which they sold to systems integrators such as Meridian Data and Optical Media International for around \$12,000 to \$13,000. The integrators added software and sold complete subsystems to end users for \$25,000 to \$30,000. But they were expensive and awkward: They could write only in one uninterrupted session (called Track-at-Once Recording, defined by the Orange Book, Part II, specification) and they took about an hour to fill a CD.

Enter Philips Consumer Electronics Co. and JVC. Earlier this year, Philips brought out the least expensive recorder to date. The CDD 521 costs \$6,000 alone; a complete subsystem that includes *Personal Publisher* software from Meridian should sell to end users for under \$8,000.

Philips's recorder is the first to support Multi-Session Recording (Orange Book, Part II) and the first to deliver Double-Speed Recording, which fills a CD in about half an hour (although you need a dedicated hard disk to take advantage of this mode). Before the end of the year, Philips and Meridian will ship the CDD 531, which bundles the recorder with a system board, hard drive, and *Netscribe* software that will promise plug-and-play capability with the network. The two companies hope *Netscribe* will establish the standard for CD-ROM on the network.

Another new player in recorders is JVC, which recently began selling a half-height internal recorder to integrators for \$4,500 and a complete subsystem, called the Write-Once CD-ROM Drive, to end users for under \$13,000. JVC's hardware supports Multi-Session Recording, but the software currently does not. A Multi-Session product is planned for May, with pricing to be determined. Also due later in the year is a new drive from Sony that does Double-Speed Recording but not Multi-Session Recording.

Meanwhile, the price of media keeps falling. Last year, disks cost \$50 to \$60. Now they're around \$30 to \$40 and are expected to go as low as \$10 a year from now.

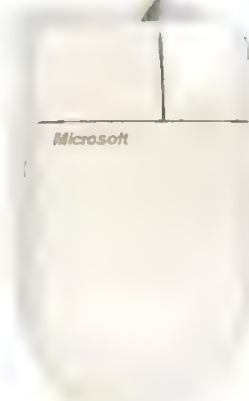
—Mary Kathleen Flynn



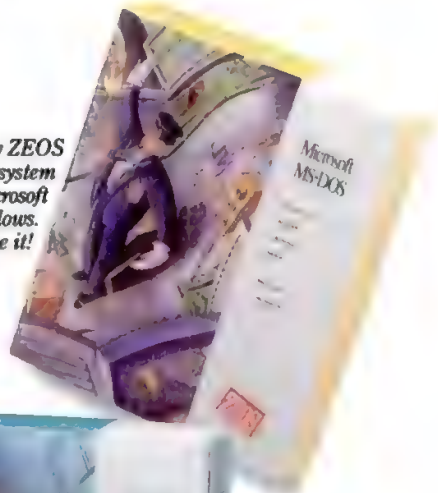
When you buy a new Windows system package from ZEOS[®] you really get a bundle.

Now Pick 2:
Lotus 1-2-3
for Windows,
Ami Pro 2.0
or Freelance
Graphics!

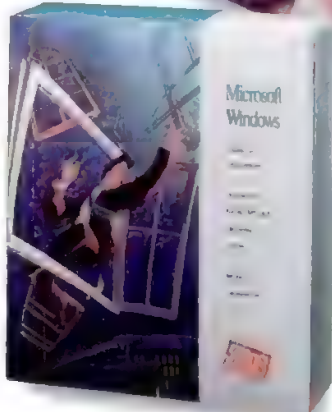
Fly through
applications on
your new ZEOS
Windows system
with your genuine
Microsoft Mouse.



Your new ZEOS
Windows system
includes Microsoft
Windows.
You'll love it!



Wrap your
Windows
system up with
the latest and
greatest DOS
version, Microsoft
DOS 5.0! Fully
featured and fully
documented.
You're going
to love it!



ZEOS.

There's no reason to buy anything else.

800-423-5891

This offer is good for a limited time only. A ZEOS Windows system is any new ZEOS computer system packaged with Windows, 2MB DRAM or more and a mouse. Lotus 1-2-3 and Ami Pro are trademarks of Lotus Development Corporation, Microsoft and Windows of Microsoft Corporation. All prices and specifications are subject to change without notice, call for current information. ZEOS is a publicly traded company NASDAQ/NMS Symbol. ZEOS © ZEOS International, Ltd., 530 5th Avenue NW, St. Paul, MN 55112 LOTB-2/4



Computers Now!

SAME DAY SHIPPING. GUARANTEED!*



We've built the best for you.
It's great! ZEOS Systems
are the best money
can buy *plus* they're
ready to ship to
you today.

YOU WANT A ZEOS? YOU GOT IT. RIGHT NOW. GUARANTEED!*

Yes! We can ship your new ZEOS '386 or '486 today. We've built up an extra supply of the hottest selling computers in America—the spectacular ZEOS 386SX-20 plus our ultra-fast upgradables: the ZEOS 386DX-33 and 486-33. Hot systems—*ready now!*

Take your pick. All three of these color VGA screamers come packing a high-capacity high-speed hard drive, tons of memory, two floppies plus all the other goodies. And they're ready to ship right to you. *Right now!*

Here's how it works. We have these systems pre-built and ready to go. While supplies last, we will ship any of these systems to you the day you order subject to these conditions:

1. Your order must be received by 1PM Central Time.
2. Credit cards are subject to authorization.
3. Orders must be for ZEOS '386 or '486 systems configured as shown here. Any other systems or upgrades are custom-built and will take slightly longer.

*OUR GUARANTEE TO YOU:

If we accept your order for immediate shipment and fail to ship your system under

the conditions outlined, we will ship it *at our expense* as soon as it is ready.

This offer is good only as long as these pre-built systems remain in stock; please give us a call to verify availability. This offer does not apply to other ZEOS systems or custom configurations.

IMMEDIATE SHIPMENT IS ONLY PART OF THE STORY.

These are not just any computer systems. They're high performance, high quality ZEOS systems. Packing all the ZEOS value that has won *PC Magazine Editors' Choice*—*nine times!*

But the real winner is you. Compare price, performance, quality and features. You'll see why *PC Magazine* selected ZEOS '386 systems "For Overall Excellence" above all others. But don't stop there.

How about 24-Hour-a-Day Toll-Free Technical Support. That means 24 hours a day, 365 days a year, your phone is a toll-free hotline, direct to ZEOS. For any questions you might have. Add that to our 30-Day Absolute Satisfaction Money-Back Guarantee, One Full Year Limited Warranty, Express Replacement Policy and our complete Customer Satisfaction Package. . . . You'll love it all. Almost as much as your new system.

So give us a call right now. If we hear from you by 1:00 this afternoon, we'll get your new system on the way to you today! Call now toll free: 800-423-5891.

Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications subject to change without notice. Please call to confirm pricing, specification and warranty details. The following are trademarks of their respective corporations: Microsoft, MS-DOS and Windows of Microsoft Corporation; Lotus, 1-2-3 & Ami Pro of Lotus Development Corporation; ZEOS, Computers Now!, SpaceSaver and Z-Card of ZEOS International Ltd. © 1992 ZEOS International Ltd., 530 5th Avenue, N.W., St. Paul, MN 55112 USA. ZEOS is a publicly traded company, NASDAQ symbol: ZEOS.

CN3S-2/4

It's what everyone wants. 2MB ultra-high-speed RAM, 85MB drive, VGA color, your choice of 2 Windows applications and more!

ONLY \$1995

- '386SX-20 CPU, 8/20MHz.
- 4MB of zero-wait RAM, expandable to a system total of 16MB on the motherboard.
- 107MB high-speed IDE hard drive.
- 1.2MB and 1.44MB Teac® floppies.
- ZEOS 14" high-res 1024x768 non-interlaced VGA color monitor with Tilt/Swivel base.
- High-speed Diamond SpeedStar Hi-Color VGA graphics card with 1MB RAM and Sierra DAC (32,000+ colors) plus WinRIX drawing software!
- Microsoft Windows, Microsoft Mouse, and now pick 2 of 3 Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0 (with Adobe Type Manager) or Freelance Graphics!
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101-key SpaceSaver keyboard.
- High-speed ZEOS I/O with two serial, one parallel & one game port on the motherboard.
- 7-16, 1-8 bit expansion slots. 80387SX math coprocessor support.
- Rugged ZEOS SpaceSaver case with two cooling fans for added reliability and product life.
- Seven drive bays and our custom 200 watt power supply for your future expansion!
- Includes ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction package.

Incredible Upgradable! 128K cache, 4MB RAM, 130MB HDD, VGA color & Windows bundle. Power packed and ready to go!

ONLY \$2595

- Upgradable '386-33 CPU, 8/33MHz dual speed keyboard selectable.
- Ultra-high-speed zero-wait 128K SRAM cache.
- 4MB of high-speed RAM, expandable to a system total of 32MB on the motherboard.
- Ultra-fast 130MB IDE hard drive.
- 1.2MB and 1.44MB Teac® floppy drives.
- ZEOS 14" high-res 1024x768 non-interlaced VGA color monitor with Tilt/Swivel base.
- High-speed Diamond Stealth Hi-Color VGA graphics card with 1MB RAM and Sierra DAC (32,000+ colors) plus WinRIX drawing software!
- Microsoft Windows, Microsoft Mouse, and now pick 2 of 3 Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0 (with Adobe Type Manager) or Freelance Graphics!
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101-key SpaceSaver keyboard.
- High-speed ZEOS I/O with two serial, one parallel & one game port built onto the motherboard.
- 7-16 and 1-8 bit expansion slots. 80387 math coprocessor support.
- Rugged ZEOS SpaceSaver case with two cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 watt power supply now with its own built-in surge suppressor.
- Includes ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction package.

Editors' Choice... Incredible Upgradable! 128K cache, 4MB RAM, 130MB HDD, VGA color, your choice of 2 Windows applications and more. Order it Federal Express and this racer can be on your desk tomorrow!

ONLY \$2995

- Upgradable '486-33 CPU, 8/33MHz dual speed keyboard selectable.
- Ultra-high-speed zero-wait 128K SRAM cache.
- 4MB of zero-wait RAM, expandable to a whopping 32MB on the motherboard.
- 130MB high-speed IDE hard drive.
- 1.2MB and 1.44MB Teac® floppy drives.
- ZEOS 14" high-res 1024x768 non-interlaced VGA color monitor with Tilt/Swivel base.
- High-speed Diamond Stealth Hi-Color VGA graphics card with 1MB RAM and Sierra DAC (32,000+ colors) plus WinRIX drawing software!
- Microsoft Windows, Microsoft Mouse, and now pick 2 of 3 Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0 (with Adobe Type Manager) or Freelance Graphics!
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101-key SpaceSaver keyboard.
- High-speed ZEOS I/O with two serial, one parallel & one game port built onto the motherboard.
- 7-16 and 1-8 bit expansion slots.
- Rugged ZEOS SpaceSaver case with two cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 watt power supply now with its own built-in surge suppressor.
- Includes ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction package.

**Now Pick 2 of
Lotus 1-2-3
for Windows,
Ami Pro 2.0 or
Freelance Graphics!**



CIRCLE 065 ON READER SERVICE CARD

**ZEOS.
Fast Delivery,
Great Systems!
A Few Expert
Opinions:**

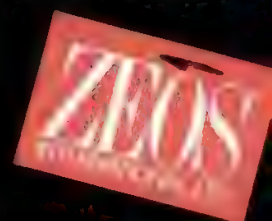
■ **PC Magazine**
On the ZEOS
386SX, "With so
much going for
it, how could
you go wrong?"

■ **PC Magazine**
On ZEOS '386
systems, "Out of
104 Machines.
For Overall
Excellence we
selected ZEOS
International."

■ **Editors' Choice**
PC Magazine,
On ZEOS '486,
"...top-speed
performance at
an affordable
price."

**ORDER NOW TOLL FREE
800-423-5899**

**Fax Orders: 612-633-1313
Govt: 800-245-2449
GSA# GS00K91AGS517
Hearing Impaired (TDD)
Orders: 800-228-5388
Outside US and Canada
612-633-6131
MasterCard, VISA, Discover, Am Exp, Z-Card, C
and leasing programs.
Open 24 Hours a Day,
365 Days a Year!**



All the benefits of a laser printer

C size



A size



DESKTOP CONVENIENCE

RELIABILITY

LOW COST

SHARP, HIGH QUALITY OUTPUT

FAST PRINTING SPEED

PLAIN PAPER

On a much larger scale.



\$1499

At last. A personal output device that combines the best features of a desktop laser printer with the ability to produce large format drawings. It's called ProTracer — a 360 dpi desktop printer/plotter that produces A, B, as well as C-size output.

ProTracer's speed and quiet operation come from the latest Canon inkjet technology and an Intel i960 processor. Drawings that take up to half an hour to print on a pen plotter take only five minutes on ProTracer!

And, unlike other large format devices, ProTracer isn't limited to plotting. Start with the ProTracer base unit that incorporates resident IBM ProPrinter and Epson LQ-1050 emulations, as well as an ADI plotter driver for AutoCAD users. Then, depending on your needs, choose from a variety of optional accessories includ-

ing HP-GL® and PostScript® language emulation cards.

Optional Printer Accessories

HP-GL emulation card	\$399
PostScript language emulation card	\$499
2 MB memory upgrade	\$299
4 MB memory upgrade	\$499
8 MB memory upgrade	\$899
Sheet feeder I (100 sheet)	\$149
Sheet feeder II * (100 sheet)	\$129
PacificTalk (AppleTalk interface module)	\$199

* Sheet feeder I is required for use

ing and plotting capabilities, call Pacific Data Products at (619) 597-3200 ext. 2110, Fax (619) 552-0889.

**PACIFIC DATA
PRODUCTS**

Pacific Data Products, Inc., 9125 Rehco Road, San Diego, CA 92121. ProTracer is a trademark of Pacific Data Products, Inc. PostScript is a registered trademark of Adobe Systems, Inc. Canon is a registered trademark of Canon, Inc. All other trade names referenced are the trademarks or registered trademarks of the respective manufacturer. Nozzle image courtesy of AutoDesk Inc. Tiger rendering, artist unknown; picture part of public domain. ProTracer uses the latest in high technology innovation including PeerlessImage™, the advanced Imaging Operating System from Peerless. EUROPEAN OFFICES: Geneva Tel (41) 22 41 26 50, Fax (41) 22 41 06 82, France Tel (33) 1 39 23 20 00, Fax (33) 1 39 63 31 20, U.K. Tel (44) 442 231414, Fax (44) 442 23 65 40 © 1992 Pacific Data Products, Inc.

First Looks

Hands-on Reviews of the Latest Products

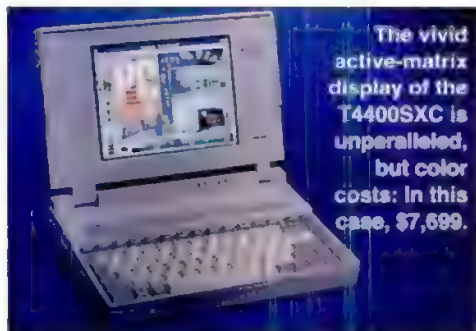
Color on the Road: AST and Toshiba Notebooks Join Battery-Powered Convoy



Battery-operated color notebook computers are finally a reality, and though the prices are high, the color displays are attractive, especially the active-matrix display of Toshiba's \$7,699 T4400SXC, a 25-MHz 486SX system. AST's \$4,295 Premium Exec 386SX/25C, which is based on an AMD processor and has passive-matrix display technology, is a relative bargain for color portable computing.

TOSHIBA T4400SXC

Toshiba's first battery-powered color notebook is exactly what you'd expect from Toshiba: high-quality at a high price. Its crisp 8.5-inch diagonal active-matrix screen matches the quality and brightness of the NEC UltraLite SL/C, the only other active-matrix notebook currently available. But by using a 25-MHz 486SX processor rather than a mere 386SX or SL, the \$7,699 Toshiba



The vivid active-matrix display of the T4400SXC is unparalleled, but color costs: In this case, \$7,699.

T4400SXC is the most powerful color notebook you can buy.

The T4400SXC is a variation on a theme. Toshiba made the T4400SX with three screen types: monochrome gas plasma or LCD (see First Looks, April 14, 1992), or color active-matrix. Measuring 2.3 by 11.7 by 8.3 inch (HWD), Toshiba increased the case height by only 0.1 inch and added 4 ounces to accommodate the color screen. Still, it weighs only 7.75 pounds including the battery.

The system comes standard with 4MB RAM and a fast 80MB hard disk. A 120MB disk is op-

tional. The case accommodates an internal modem (or a fax/modem option that will be available soon). The T4400SXC has the standard I/O ports and the Western Digital video controller allows for simultaneous operation

of an external VGA monitor, making presentations to a large group more feasible.

BATTERY-POWERED ACTIVE MATRIX

The thin-film transistor (TFT) active-matrix screen is stunning. It was developed by Display Technologies, a partnership between Toshiba and IBM Japan, and it operates at 640-by-480 resolution with 256 simultaneous colors from a palette of 185,193 colors. It has a 60:1 contrast ratio, a wide viewing angle, and has absolutely none of the cross-



AutoCAD under Windows:

The leader in drafting joins two other Windows CAD applications.....38

NewWave 4.0:

HP's Windows manager has gotten friendlier.....44

dBASE IV 1.5:

Can Borland keep it on top?.....46

talk that hinders slower passive-matrix screens.

This is Toshiba's first implementation of its low-powered active-matrix screen, and it lets TFT color operate in a battery-powered notebook. Using a 2.3-pound nickel cadmium battery, the T4400SXC lasted for more than 2 hours on PC Magazine Labs' Battery Rundown test, assuming the worst-case scenario for power usage: All of the unit's power conservation features were disabled. More than 2 hours is commendable, considering that both the 486SX and the color screen require extra power.

CONTINUES ON PAGE 40

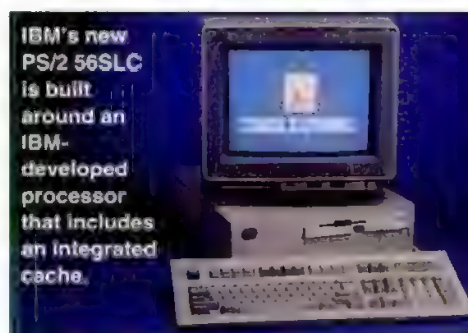
IBM PS/2 56 SLC: Internal Cache Offers Speed Gains over SX Chip



In IBM's new lineup of 386SX-family computers, the PS/2 56 SLC is the most appealing. The 56 SLC lacks the added expansion room of the larger 57 SLC, but its compact, upgradable design and surprising performance make it a likely candidate for users

with moderate needs. The reason for the good performance is the IBM-made 386SLC processor chip.

The SLC comes in a small-footprint case measuring 4.5 by 14.25 by 15.5 inches. For \$3,560, you get 4MB RAM, an 80MB hard disk, a 2.88MB floppy disk drive, and a built-in VGA adapter with 512K of video RAM. The



IBM's new PS/2 56SLC is built around an IBM-developed processor that includes an integrated cache.

same system with a 160MB hard disk costs \$4,030.

The 56 SLC has expansion room for one extra 5.25-inch

storage device that can use removable media. There are also three 16-bit Micro Channel architecture slots, all free.

If you like the 56 SLC's design, pricing, and performance but want more room for drives and boards,

the 57 SLC is the answer. It comes with five free MCA slots and two open 5.25-inch drive

CONTINUES ON PAGE 42

Windows CAD: Three New Choices

AutoCAD Windows Extension: A Tentative, Successful Step

HANDS ON
by Jeff Prosser

Loyal *AutoCAD* users have waited a long time for Autodesk to bring the leading CAD program to Windows, but *AutoCAD*, Release 11, *Extension for Windows* (AEW), the recently released Windows version of *AutoCAD*, Release 11, was well worth the wait.

AEW, an add-on module to the DOS version of *AutoCAD*, Release 11, is a smooth move toward the Windows environment, sacrificing only a fraction of the power of the DOS version in return for enhanced functionality in other areas and greater ease of use. With the exception of AME (Advanced Modeling Extension) and network licenses, neither of which is available in the Windows version, AEW does just about everything that Release 11 for DOS does. Plus, AEW users get all the benefits of working in the Windows environment. Features that appear in AEW but not in the DOS version of Release 11 include DDE support, the ability to import and export graphics through the Windows Clipboard, on-line access to the *AutoCAD* reference manual, and a programmable, icon-based toolbar similar to those featured in other Windows ap-

plications such as *Microsoft Word* for Windows and *Excel*.

The toolbar may be the single most important enhancement to AEW. Status panels in the toolbar show the current color, drawing layer, and cursor coordinates. Three pre-programmed buttons allow you to quickly toggle orthogonal and snap modes on and off, and to switch to paper space. (Here, AEW's designers didn't go far enough; it would be helpful if the toolbar could be configured to show other parameters such as the current object snap mode.) The remaining buttons may be programmed with the command or commands of the user's choice, permitting complex command sequences to be executed with a single mouse click.

PLEASANT SURPRISES

AEW is full of pleasant surprises. The user interface is highly configurable, so if you don't like the traditional *AutoCAD* command menu that occupies the right side of the screen or the command line that appears at the bottom, a simple configuration change removes them. Unlike many Windows applications, which disable input while a time-consuming operation is underway, AEW keeps its message queue active during lengthy screen

Most settings are controlled through dialog boxes like this one. Help with individual dialog boxes is available through the program's extensive on-line help facility.



redraws. If you don't want to waste time while AEW redraws a complex screen, you can switch to another Windows program and return when redrawing is complete.

Surprisingly, AEW still permits you to work on only one drawing at a time. This will probably be remedied in Release 12 (due later this year), which is expected to support Windows' Multiple Document Interface.

Performance wise, AEW can't compare to the DOS-based *AutoCAD*. In our informal tests, AEW took an average of four times longer to draw the ubiquitous *AutoCAD* fire hose nozzle than did the DOS version of Release 11. If you plan to use AEW in industrial applications, you should invest in a fast processor and a video card that is optimized for Windows.

AEW's help system should serve as a model for other Windows applications. The basic help system features help on *AutoCAD* commands and system variables, drawing tools, and procedures, and it even includes a glossary of terms. For the cost of another 12MB of hard disk space (the basic AEW installation requires about 10MB), you can install Enhanced Help, which gives you on-line access to a hypertext-based version of the *AutoCAD* reference manual.

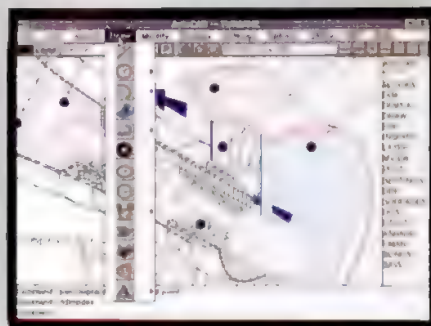
Hardy souls who tapped the ADS (Autodesk Development System) to customize *AutoCAD*, Release 11, won't be disappointed in the Windows version. AEW also supports ADS, enabling developers to write *AutoCAD*-callable routines in Microsoft C, QuickC for Windows, and Borland's C++ 3.0 (if you use Microsoft C, you'll need the Windows SDK, too).

Drawing files created with

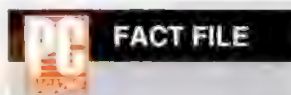
AEW are binary-compatible with files created with the DOS version. Windows users won't have to worry about maintaining separate sets of drawing files. Other file types, such as .LSP and .SLD files, may also be used interchangeably.

Prior to AEW's release, industry watchers wondered whether the name *AutoCAD*, Release 11, *Extension for Windows* meant the product was a hasty port from the DOS version designed to stall sales of other Windows CAD products until Autodesk could bring Release 12 to market. Don't be misled by the name. AEW is a full-blown Windows application, not a DOS application in Windows clothing.

AEW's low price of \$99, combined with the explosive popularity of Windows, should be enough to virtually guarantee its success. Veteran *AutoCAD* users will love it because they can now run *AutoCAD* alongside other Windows applications. New users will appreciate it too, because AEW makes learning *AutoCAD* easier than before. ■



The *AutoCAD*, Release 11, *Extension for Windows* editing screen features pull-down menus and a toolbar at top, and the traditional *AutoCAD* menu at right.



AutoCAD, Release 11, **Extension for Windows**
Autodesk, 2320 Marinship Way, Sausalito, CA 94965; 800-964-6432; 415-332-2344.
List Price: \$99.
Requires: 4MB RAM (6MB recommended), 20MB hard disk space, Microsoft Windows 3.0 or later; math coprocessor; DOS version of *AutoCAD*, Release 11 (\$3,500).
In Short: A Windows-specific extension to *AutoCAD*, Release 11, that brings the power and sophistication of the industry's flagship CAD program to Windows users.

CIRCLE 433 ON READER SERVICE CARD

Drafix Windows CAD 2.0: Upgrade Sharpens GUI Interface, Adds Macros



Foresight Resources' latest version of *Drafix Windows CAD* is a thoughtfully designed program that includes some 40 new features, all fashioned to extend the usefulness of your mouse and virtually eliminate the need to use pull-down menus for routine drafting tasks. The \$695 Windows-based drafting tool is much improved from its earlier GUI version (see "Low-Cost 2-D CAD: Computerized Design for the Rest of Us," December 17, 1991).

First introduced for Windows in 1989, *Drafix Windows CAD* retains the sophistication users have come to expect from top drafting programs. Features include associative dimensioning; a variety of grid and item snaps; and tools for automated drawing of lines, arcs, circles, curves, polygons, and ellipses as well as

freehand sketches and numerous line terminator types. You can create these entities in any of 16 colors with up to nine line types.

Like its DOS-based sibling, *Drafix CAD Ultra*, *Drafix Windows CAD* doesn't skimp on editing features, either. The program offers numerous tools allowing users to trim, stretch, move, rotate, copy, and scale entities. It also performs some simple automatic extrusions, although those looking for 3-D modeling and rendering capabilities will have to export their drawings to a program suited for that purpose. To that end, *Drafix Windows CAD* will create *AutoCAD*- and *Micrografix Designer*-compatible .DFX files as well as Windows Metafile (.WMF) formats. The program is now fully compatible with DDE (dynamic data exchange) as well as the Windows Clipboard.



Drafix Windows CAD takes point-and-click to the *n*th degree. An icon-based draw and edit palette and user-definable buttons minimize menu and keyboard operations.

ADDED VALUE

Drafix Windows CAD allows up to four active windows and provides an intelligent cursor that changes shape depending on the snap mode currently in use. A new CAD Edit Bar atop the screen lets you edit drawing entities with precise values, eliminating guesswork with the mouse.

Drafix Windows CAD offers iconic selection of drawing and editing tools. Should these not meet your needs, however, you can program macros with *Drafix Windows CAD* that appear on-screen as Windows buttons for nearly any CAD function.

Drafix Windows CAD is a

compelling program that lets Windows users turn their backs on DOS-based CAD apps. It's a full-featured entry into the Windows-based drafting world. ■

List Price: *Drafix Windows CAD*, Version 2.0, \$695; upgrade from Version 1.1, \$145; additional symbol libraries, \$150. Foresight Resources Corp., 10725 Ambassador Dr., Kansas City, MO, 64153; 800-231-8574; 891-1040. **Requires:** 2MB RAM (4MB recommended), 5MB hard disk space, Microsoft Windows 3.0 or later. Math coprocessor recommended.

CIRCLE 432 ON READER SERVICE CARD

MacDraft For Windows: Cross-Platform Support For Simple Drawings



Innovative Data Design's \$495 strangely named *MacDraft for Windows* is the first Windows app to wear the Macintosh moniker, and although it provides cross-platform compatibility with *MacDraft for the Mac*, it isn't likely to start a stream of Mac CAD experts rushing to Windows as their new CAD environment.

IDD would be the first to tell you that *MacDraft for Windows* is not really a CAD program. In fact, it lacks many CAD features, including the line clipping, joins, and chamfering that you find in other Windows CAD packages (including the more expensive *Drafix CAD*, also reviewed here). It is, however, an easy-to-use drafting program best suited to simple drawings that do not require the accuracy

or full toolset provided by a full-fledged CAD program.

The user interface is straightforward. A vertical tool palette on the left side of the drawing area contains the standard array of drawing tools: line, circle, arc, perpendicular line, polygon, and freehand tools. Conspicuously missing is a zoom tool. All zooms must be performed by menu selection or key combinations, but views can be saved and recalled for future reference.

Each tool, when clicked and held, displays a subpalette of tools that give you optional configurations. For instance, clicking on the arc tool displays the tools for drawing arcs on the basis of the radius or three points, or for drawing elliptical arcs. The chosen subtool then becomes the displayed tool on the main palette. It remains the default tool until changed, a variation on the concept of sticky menus. Most tools

can be constrained using the Shift key, and the Ctrl key acts as a universal unconstrain switch, releasing grid snaps and tool constraints.

MacDraft drawings can contain any number of layers, limited only by system resources. Layers can be exchanged between drawings and can contain up to 15,000 drawing objects.

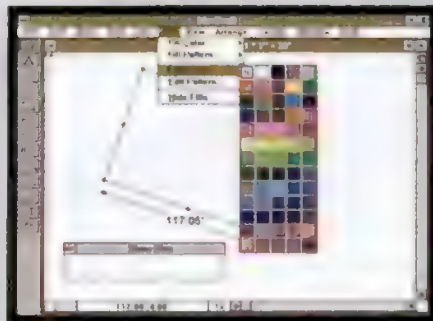
Drawing sizes are limited to the output options of your current printer driver, but large drawings can be spread across adjacent pages. There is no option for user-defined drawing sizes.

Ultimately, *MacDraft* is not really a CAD program; you'd

never want to tackle really tough technical drawings without clipping or joining. And it's not really a drawing program, because it lacks many of the sophisticated color and draw effect capabilities of even low-end drawing programs. It does provide a cross-platform solution for basic drafting that is easy to use, easy to learn, and inexpensive. ■

List Price: *MacDraft for Windows*, Version 1.0, \$495. **Requires:** 1MB RAM, Microsoft Windows 3.0 or later. Innovative Data Design Inc., 2280 Bates Ave., Suite A, Concord, CA 94520; 510-680-6818.

CIRCLE 436 ON READER SERVICE CARD



MacDraft for Windows lets you edit fill colors and patterns and save them in a palette.

First Looks

Color Notebooks

CONTINUED FROM PAGE 37

UPGRADABLE PROCESSOR

The T4400SXC can be upgraded to a full 486DX in a delicate operation not recommended for the fainthearted. To access the 486SX, you must first remove the keyboard and an underlying bracket before you can replace the CPU, which is in a zero-insertion-force (ZIF) bracket.

The T4400SXC performed admirably on PC Labs' benchmark tests, providing full 486SX power.

All this power and beauty come at a price. You could buy the Dell 325NC, the AST Premium Exec 386SX/25C, and throw in a Dell 325NC color notebook for the price of a T4400SXC. A comparably equipped monochrome LCD T4400SX costs \$2,100 less than the color version.

While Toshiba again sets the standard in color and power with the T4400SXC, it is likely only a few can justify spending such a large amount. But for those who need a battery-driven color note-

book, Toshiba's 486SX-powered T4400SXC will deliver in style.

AST PREMIUM EXEC 386SX/25C

If you want color in a battery-powered notebook and don't want to pay an arm and a leg, you'll find the AST Premium Exec 386SX/25C a good buy. Listing for \$4,295 with 4MB RAM and an 80MB hard disk or \$3,995 with a 60MB hard disk, the 386SX/25C is identical to the monochrome Premium Exec 386SX/25 except for its display.

The AST's display is a big step beyond the first generation of passive-matrix color displays from Toshiba and others. While the colors are deeper and richer, the quality still falls short of the brighter, more expensive active-matrix color screens currently used in Compaq, Dolch, NEC, and Toshiba portables.

Slightly larger than the average notebook, the AST measures 2.3 by 11.4 by 9 inches (HWD) and weighs 7.5 pounds including the battery. The 1-pound AC power brick measures 2.2 by 3 by 6.5 inches. You can upgrade the standard 4MB of RAM with a 4MB kit (\$599) for a maximum of 8MB. There's also a socket for a 387SX math



At \$4,295, the AST 386SX/25C is more affordable, but its passive-matrix display isn't as vibrant as an active-matrix display.

coprocessor. An internal expansion slot accommodates one of three optional modems. Standard ports include an external VGA port (which simultaneously supports the internal VGA display and an external display at 800-by-600 resolution), one serial port, one parallel port, and a PS/2 port configurable for an external keyboard, numeric keypad, or mouse.

On PC Labs' Battery Run-down test, the 386SX/25C tested at an adequate 1 hour 46 minutes with all power conservation features disabled. Power management features include backlighting and hard disk timeouts, low-speed CPU mode, and a suspend mode activated by closing the display cover. The notebook also comes with Windows and Protected-mode suspend drivers

to enable system shutdown under Windows. The 386SX/25C's passive-matrix screen displays 16 colors in 640-by-480 resolution or 256 colors at 320-by-200 resolution from a palette of 256,000 colors.

When you run

Windows or color applications, you'll find the color true but slightly faded. It looks pretty good, but it's clearly not as bright or rich as the color displayed on active-matrix screens.

You can easily set brightness and contrast from front panel controls and find a comfortable viewing angle with the 180-degree adjustable tilt screen.

The AMD-manufactured CPU and AST's motherboard work well together, with PC Labs' benchmark tests showing it falling just behind a similar Zenith Data Systems 386SL color notebook.

While initial discounts are likely to be only 10 to 15 percent, prices will drop as shipping quantities catch up with market demand and as competitive notebooks appear. With the price bound to drop, the color and portability of the AST 386SX/25C will be even more deserving of your attention.

List Price: AST Premium Exec 386SX/25C: with 4MB RAM, 80MB hard disk, 1.44MB floppy disk drive, DOS 5.0, \$4,295; with 60MB hard disk, \$3,995; 2,400-bps data modem, \$249; fax modem, \$499. AST Research Inc., 16215 Alton Pkwy., P.O. Box 19658, Irvine, CA 92713; 800-876-4278, 714-727-4141.

CIRCLE 430 ON READER SERVICE CARD

List Price: Toshiba T4400SXC: with 4MB RAM, 80MB hard disk, 1.44MB floppy disk drive, DOS 5.0, \$7,699; with 120MB hard disk, \$8,199; 2,400-bps modem, \$279; 2MB RAM upgrade, \$399; 4MB RAM upgrade, \$699; 8MB RAM upgrade, \$1,299; Desk Station IV, \$999. Toshiba America Information Systems Inc., 9740 Irvine Blvd., Irvine, CA 92718; 800-334-3445, 714-583-3000.

CIRCLE 431 ON READER SERVICE CARD

BENCHMARK TESTS: AST PREMIUM EXEC 386/25C and TOSHIBA T4400SXC

The AST Premium Exec 386SX/25C, with its 25-MHz AMD 386SX, lags behind the Zenith MastersPort 386SLe in processor and memory performance. This is largely due to the optimized design of Intel's SL processor, which incorporates the RAM cache controller into the CPU. AST's optimized video subsystem featuring Cirrus Logic's 64/10 controller and color support logic compensates in part for its slower processor scores; however, it cannot match the video performance of Toshiba's T4400SXC. A 25-MHz Intel 486SX with its 32-bit external data path, combined with Western Digital's new WD90C30 video controller, makes this Toshiba an excellent portable graphics system.

PC Magazine Labs' Hardware Performance Tests, Release 6.0, measure the PC's processor, memory, disk, and video subsystem performance.

The **processor** test consists of eight routines that measure different aspects of the CPU's performance and its interaction with cache and main memory. We report the results in

processor operations per second.

The **memory** benchmark test measures the read/write performance of the computer's first 640K of conventional memory. We report the results in kilobytes per second.

The **disk** benchmark test evaluates the mechanical drive speed, hard disk controller functions, and bus speed, using a series of small-record (512-byte and 4K) and large-record (16K and 32K) exercises that include file-create, sequential write/read, and random write/read operations. We report the results in kilobytes per second.

The **video** benchmark test consists of text and graphics routines. These test memory writes from memory to screen, screen fills, and bit-block transfers (BitBlts). We report the results in thousands of video operations per second.

PC Labs mathematically reduces the raw test scores to yield an appropriate mean, and all the tests were run with the RAM and video cache shadowing enabled.

	Processor (operations per second)	Memory (kilobytes per second)	Disk (kilobytes per second)	Video (thousands of operations per second)	Battery Run-down (hours: minutes)
Toshiba T4400SXC	265.39	4,794.94	147.84	3,292.21	2:26
ZDS MastersPort 386SLe	127.48	2,593.70	152.33	1,356.60	2:53
AST Premium Exec 386/25C	112.39	2,188.24	153.06	1,930.74	1:46

There was a time when we all worked QMS-PS 1700 individually. We each had a computer and we each had a printer. Today, many of us work in groups. We choose our computers for their ability to perform well within networks. Shouldn't the same criterion now apply to our printers?

HOW TO SPOT THE TRUE NETWORK PRINTER AMONG A HOST OF IMITATORS.

1-800-523-2696 EXT 2933

Unlike most printers that merely claim to be appropriate for network applications, the QMS-PS® 1700 was conceived and built to be the most efficient printer there is in a network environment. In terms of cost, as well as performance.

Proprietary software that resides within a 25 MHz RISC controller is what sets this printer apart from all others.

It handles PostScript® documents up to six times faster than the more common 68020 microprocessor. And it's the heart of an architecture you'll find in printers that come from QMS and only QMS. We call it Crown.

Consider whether its benefits would help your group work even more efficiently.

The QMS-PS 1700 recognizes incoming data and selects the right printer language without troublesome software reconfigurations.

The QMS-PS 1700 connects to Ethernet® networks configured as DECnet®, TCP/IP, NetWare®, or EtherTalk™ protocols or to Token Ring configured to support the NetWare protocol. And it can be shared between multiple computers

The Rom card gives control over the



the LAN administrator printer's settings.



with different operating systems. Its input buffers spool jobs so that host applications aren't hung up waiting for files to print.

The input capacity of the QMS-PS 1700 is 1,000 sheets. Output is 500. And there's an optional duplexer for two-sided work.

What's more, if a job is interrupted for any reason, this printer has the intelligence to reprint any needed pages and then continue.

Its context switching capability preserves "states," such as fonts and macros, when switching

between emulations so you don't waste time downloading them each time.

Font or emulation storage can be expanded with optional internal and external SCSI hard drives.

So the QMS-PS 1700 is much more than a laser printer. In fact, it's exactly what most work groups need but haven't been able to find. Until now. The QMS-PS 1700 is The Network Printer.



	QMS-PS 1700	HP 1700
Both 300 and 600 DPI resolution	✓	
Concurrent interfacing	✓	
Spooling	✓	
Context switching	✓	
Security system	✓	

You could compare the QMS-PS 1700 to the HP III Si, but there really is no comparison.



Multi-res lets you switch between the exceptional output of 600 dpi and the speedier 300 dpi resolution.

Crown architecture. Proprietary hardware and software design that make our printers The Network Printers.

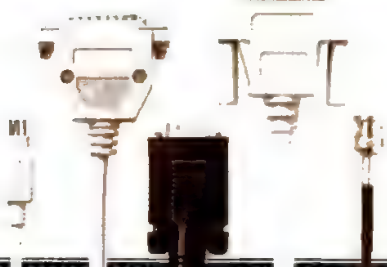
The QMS-PS 1700 printed this file in 62 seconds.



The competition took 170 seconds.

We're almost 3 times as fast.

Simultaneous Interface Operation, or SIO, lets the printer work over all its interfaces at once.



386SLC: IBM's Homegrown Processor

IBM PS/2 56

CONTINUED FROM PAGE 37

bays (from a total of four). The 57 SLC costs \$3,995 with an 80MB hard disk and \$4,465 with a 160MB disk.

The most significant component in the 56 SLC is the 386SLC CPU, a chip that is faster than other 386SX processors because of its internal 8K cache and cache controller (see the sidebar "386SLC: IBM's Homegrown Processor"). The only other difference between the SLC chip and standard 386SX CPUs is the SLC's ability to optimize some commonly used processor instructions. The processor resides on a motherboard measuring 8.5 by 11 inches, making it a likely candidate for future notebook computers. Its 386SX pin-compatibility means that the system can be upgraded easily in the future.

HOW MUCH FASTER?

Although the chip is rated at 20 MHz, the 386SLC's internal cache helps it achieve much higher performance levels than you'd expect from a 20-MHz 386SX. On PC Magazine Labs' benchmark tests, the IBM 56 SLC scored 20 percent faster on the processor tests than an Intel 25-MHz 386SL-based Compaq LTE Lite/25, and 74 percent faster than systems using Intel's 20-MHz 386SX processors. The overall performance of the 386SL is comparable to a 25-MHz 386DX chip.

The motherboard has three SIMM sockets. One is occupied by the standard 70-nanosecond

This year may well be the Year of the Processor as Intel, AMD, Chips & Technologies, and others bring forth new 386, 486, and 586-family processors. IBM's initial entry into the 386 arena, the 386SLC, is an impressive piece of engineering that adds a new level of performance to the 386SX world.

Developed and manufactured by IBM under license from Intel, the 386SLC is a true 386SX. The 386SLC uses 16-bit data and 24-bit address interfaces, a 32-bit internal instruction set, and a 16-bit external bus—all features that define the 386SX.

The 386SLC differs from standard 386SXs by including an on-board cache con-

troller, an 8K 32-bit cache, and optimized instructions to reduce the number of clock cycles needed for common processor tasks.

The major advantage of the 386SLC is performance. Rated at 20 MHz, the chip performs as well as or better than 25-MHz 386DX processors, thanks to the 386SLC's internal cache. While Intel's 486SX and 486DX CPUs have internal caches to speed performance, none of Intel's current 386SX or 386DX processors have integral caches.

IBM's standard 386SX systems—the PS/2 56 SX and 57 SX—use Intel's 386SX CPUs, but they can be upgraded easily with the pin-compatible 386SLC chip.

As impressive as the current 386SLC processor is, rumors abound of an enhanced version of the chip, to arrive later this year, that will offer 486SX-compatibility, built-in Advanced Power Management (like that of the Intel 386SL processor), 3.3-volt power, speed doubling of internal performance, and a 16K cache.

As this year progresses, we're likely to see many new CPUs. Intel has promised to introduce 30 processors during 1992, and AMD and Chips & Technologies are also working on new designs. And it won't be surprising if IBM has more processors up its sleeve for introduction this year and next.—BB

4MB SIMM and the other two can hold optional 2MB (\$250), 4MB (\$500), or 8MB (\$1,000) SIMMs, with a combined system maximum of 16MB. The motherboard also has a socket for a standard 387SX math coprocessor, a \$387 option if purchased from IBM.

The 56 SLC has an integrated SCSI controller capable of handling up to seven SCSI storage devices. Since only one such device can fit in the vacant drive bay, any others are connected to the system via an external SCSI port.

The standard integrated system video circuitry is limited to 16 shades or 16 colors at 640-by-480 resolution with a VGA

display. Super VGA or XGA are available only via optional video upgrade interface cards. Our test system came with an optional IBM 8515 VGA color monitor (\$950).

Standard video RAM on the 56 SLC is 512K on two 256K SIPP memory modules. With two vacant SIPP memory sockets, the machine could theoretically be upgraded to 1MB of video RAM. However, IBM does not have a video RAM upgrade option at this time and has not tested the video adapter with more than 512K RAM.

In addition to the SCSI and VGA ports, the PS/2 56 SLC has two serial ports, a parallel port, and PS/2 mouse and keyboard ports.

The IBM 56 SLC isn't for everyone. Neither the least expensive nor the most powerful computer you can buy, the PS/2 56 SLC is a good in-between machine. The 386SLC's on-board cache pays off for those who don't need 486 power or even the advantage of a 32-bit external bus 386DX system. The PS/2 56 SLC's list price is high compared with systems sold by most other vendors, although discounts of 25 to 30 percent may soften the blow.

You have your choice of

three keyboards: a 101-key PS/2 Enhanced-style keyboard, an 84-key space-saving keyboard, which is like the 101-key style without the numeric keypad, or a 122-key host-connected keyboard. Each keyboard is available in a variety of language versions.

The warranty is for 12 months; service is provided by authorized dealers and service centers or directly from IBM.



IBM PS/2 56 SLC

IBM Corp., 1133 Westchester Ave., White Plains, NY 10604; 800-772-2227.

List Price: With 4MB RAM, 80MB hard disk, 2.88MB 3.5-inch floppy disk, \$3,560; with 160MB hard disk, \$4,030; 2MB RAM upgrade, \$285; 4MB RAM upgrade, \$565; 8MB RAM upgrade, \$1,135; 80387SX math coprocessor, \$387; DOS 5.0, \$165.

In Short: The PS/2 56 SLC uses IBM's own cached 386SX chip, the 20-MHz 386SLC, to attain 25-MHz 386DX-level performance. While somewhat high-priced, the well-engineered, upgradable, small-footprint system is a good choice as a medium-power personal workstation or standalone system.

CIRCLE 425 ON READER SERVICE CARD

BENCHMARK TESTS: IBM PS/2 56 SLC



With its on-board 8K cache, IBM's 386SLC chip powers the PS/2 56 SLC past a 20-MHz 386SX-based Toshiba system and a 25-MHz 386SL-based Compaq system on PC Magazine Labs' processor tests. While the Compaq sports a 16K external cache, IBM's internal cache design permits greater optimization of the CPU and therefore gives better performance.

Higher scores represent better performance.	Processor (operations per second)	Memory (kilobytes per second)	Video (thousands of operations per second)
IBM PS/2 56 SLC	155.95	3,475.63	3,683.42
Compaq LTE Lite/25	129.04	2,735.41	3,030.36
Toshiba T2200SX	89.26	1,940.75	1,823.77

STAT 401 PRIP GOSSET 10/11

→ Measures of Central Tendency:

arithmetic mean = "average" = $\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$

median = middle value

mode = most common value

skewness to right  and to left 

→ Measures of Dispersion (or "spread" of the data).

Variance = $s^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$ (unbiased with $n-1$ denominator)

Standard Deviation = $s = \sqrt{s^2}$

Coefficient of Variation (c.v.) = $100 \left(\frac{s}{\bar{x}} \right)$

→ Sampling Distribution of the Mean:

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$. We estimate σ with s ; taking large n .

For $n \rightarrow \infty$, $\bar{x} \sim N(\mu, \sigma_{\bar{x}})$

(68% within 1 std. error, 95% within 2)

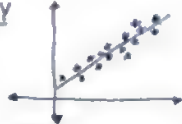
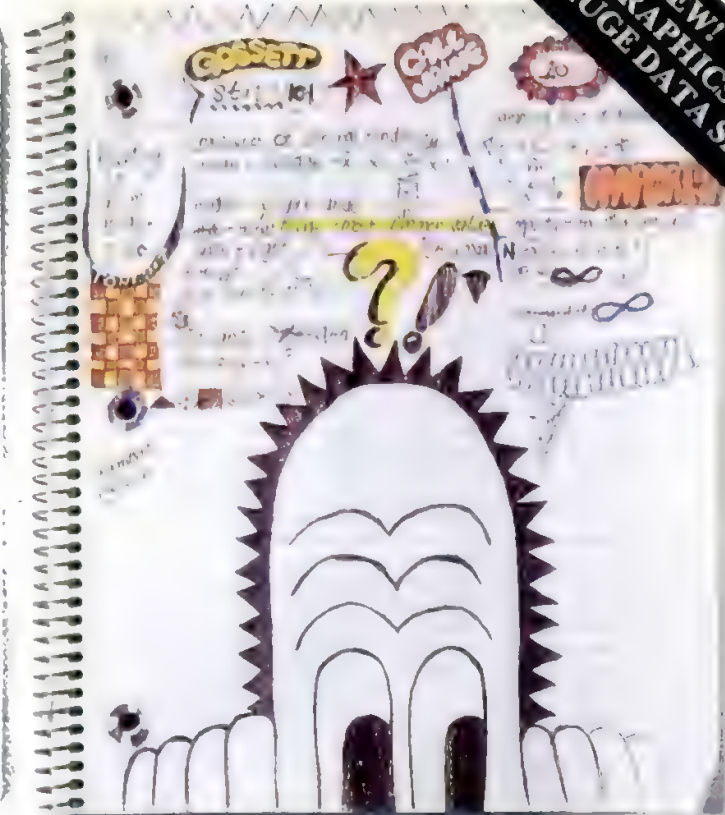


→ Least-Squares Regression:

Given X , estimate b , dependent values Y

$Y = Xb \Rightarrow b = (X'X)^{-1} X'Y$

MINIMIZES $\sum_{i=1}^n (y_i - \hat{y}_i)^2$

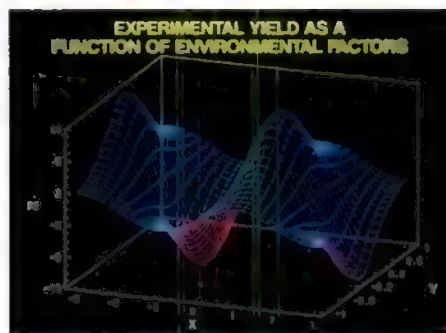
Statistical Graphics Software For Those Of You Who Majored In Statistics. And Those Of You Who Didn't.

If you majored in statistics—heck, if you *understood* statistics—one look at the over 250 built-in statistical functions will tell you that STATGRAPHICS® graduated summa cum laude. If you don't remember the first thing about statistics, don't worry. STATGRAPHICS does. And then some.

Whether you have demographic information, manufacturing yields or instrument readings, STATGRAPHICS can quickly digest thousands and thousands of numbers and calculate the key points you need. How to adjust insurance rates for different classes of drivers in different jurisdictions. Where the production bottleneck really is. What numbers alone won't tell you, STATGRAPHICS will. And then sum up the information in one of over 50 types of graphs that, in the words of PC Magazine, "will knock your socks off."

BY THE NUMBERS.

If you remember all those statistical buzzwords, here are some of STATGRAPHICS':



ANOVA, regression analysis, multivariate and nonparametric techniques, forecasting and time series analysis, quality control, experimental design and much more. If you don't remember any of those, here are some others: On-line help,

handy reference cards, telephone support, training and consulting. Along with the ability to import files from Lotus®, dBASE®, ASCII or DIF formats. And praise from all the major magazines for our ease of use.

KNOWLEDGE IS POWER.

POWER IS \$995.

Call today for more information and a free demo disk. If you're a statistician, you're really going to like it. If you're not a statistician, you're going to love it.

STATGRAPHICS

In Maryland, (301) 984-5123. Outside The U.S., (301) 984-5412

(800) 592-0050 Ext. 200

NewWave 4.0: HP's Windows Desktop Manager Goes Mainstream

MANOS ON

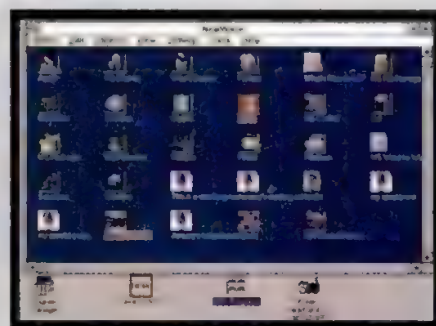
by Barry Simon

If imitation is the sincerest form of flattery, then the designers of Hewlett-Packard's *NewWave* must feel proud. Many key features in earlier versions of this Windows-extending environment now appear in Windows itself. *NewWave*'s compound document ability predates Windows' object linking and embedding (OLE), drag-and-drop is now mainstream, and the system-wide macro language announced by Microsoft was foretold by *NewWave*'s Agent. (See Trends, January 28, 1992, page 29.)

While a technical success, previous versions of *NewWave* have not been as well received by the marketplace as competitor Norton Desktop for Windows. For example, *NewWave*'s large disk space and RAM requirements shut out many potential users, and it ran only special *NewWave*-aware programs or required users to build laborious links to applications.

With its \$195 *NewWave*, Version 4.0, Hewlett-Packard is attempting to overcome these

barriers with a product that is easier to use, has less-taxing hardware requirements (only about 6MB of disk space), and offers better linking to non-*NewWave*-aware programs. In many ways it succeeds, but the program still requires a profound change in the way you interact with your computer.



The center of *NewWave* is a large window with Objects that you can easily launch, move, and copy. Traditional file management is a nonissue.

OOP FOR END USERS

NewWave attempts to bring object-oriented programming to the end-user level. When you install *Microsoft Word for Windows* as a *NewWave* program, you do not wind up with a *WinWord* icon on the *NewWave* desktop. Rather, a *WinWord* Object Master—a

template for making new objects—is created, and any files you create appear as Objects on the desktop.

For example, to make a new *WinWord* document, you choose Create Object from the *NewWave* menu, choose *WinWord* Object from the list of Masters that pops up, then hit Enter to launch *WinWord*. The *WinWord* letter or memo you then create and save will appear on the *NewWave* desktop.

Another object type is a Folder, which can contain Objects or Subfolders that can be easily moved or copied. Since file maintenance is accomplished by moving or copying objects between fold-

ers, traditional file management becomes a nonissue.

This is an attractive model for computing and a possible foretaste of the object-oriented file systems of the future. But your PC still has to live in the present, so *NewWave* includes a new command that lets you copy

PC FACT FILE

NewWave, Version 4.0

Hewlett-Packard Co., 974 E. Arques Ave., Sunnyvale, CA 94086; 408-720-3000.

List Price: \$195.

Requires: 2.5MB RAM (4MB recommended), 6.8MB hard disk space, Windows 3.0 or later.

In Short: *NewWave* takes object-oriented Windows to its logical extreme by replacing files and programs with objects and tools. Its automation tools are especially complete.

CIRCLE 420 ON READER SERVICE CARD

the file behind an object to a floppy disk for use on a non-*NewWave* system, and you still need Windows' Program Manager or File Manager to install new software from a floppy disk.

In addition to the basic desktop for creating and manipulating objects, *NewWave* includes some impressive automation tools. The core of these is the Agent, a combined batch language and macro program. You can record simple tasks and then edit them to add branching, dialog boxes, and event processing. The language is powerful but opaque.

NewWave offers a scheduler so you can run tasks at a given time or on a regular basis. If you're running *NewWave* on a network, you can arrange to be notified if a file changes. A control panel to set colors, the ability to minimize objects, and a workgroup library to transfer files across a network are also new.

While this version has eliminated some of *NewWave*'s almost religious adherence to object concepts at the user's expense, there are still some instances where purity gets in the way of practicality. For example, there is no way to use a program's multiple document interface (MDI) capabilities without coping with the underlying obscure file and directory names that *NewWave* assigns. And you can't schedule a task directly from the Agent Scheduler.

NewWave remains a program with a steep conceptualization curve to overcome. If its philosophy appeals to you, then you will find the environment well implemented and flexible. ■

NEWWAVE'S AGENT:

Advanced Macro Language for Advanced Users

NewWave's Agent language provides much more power than any other Windows batch language, but that power comes at the price of complexity. Unless you have programming experience, you'll have trouble writing tasks that go beyond basic recording.

An Agent task is a sequence of commands to the Agent kernel or to an Object. You could, for example, program a task that would dial out to pick up stock quotes, bring the information back

to a spreadsheet, and graph it for you. If the Object is a *NewWave*-supplied or *NewWave*-aware program, then there is a rich vocabulary of specialized methods to control it.

Since Agent tasks can be dynamic data exchange (DDE) clients, you'll be able to control Windows programs that understand DDE. Other Windows and DOS programs can be controlled via Send Key and Clipboard commands.

There's now a dialog box editor with a *NewWave* twist.

Dialog editors in *Microsoft Excel*, *Microsoft Word for Windows*, and *Bridge Batch* generate code in the underlying language. But *NewWave* creates an Object to represent the dialog box. Agent tasks can then call and query the Object.

The language comes with on-line help only. Addison-Wesley plans to publish a book on *NewWave* this summer. For now, mere mortals will find the language daunting.—BS

"The Best Memory Manager"

It's an easy claim to make, but we have the facts to back it up:

Our new QEMM-386 version 6 is the best way to get the most out of memory. It 'pools' all your memory so that it's available in whatever form your programs need—

expanded or extended. You don't even need to know the difference. QEMM does it all for you. Instantly. Whereas DOS 5, for example, requires you to figure out what you need, then manually allocate memory and re-boot every time you need to change.

As for the all-important 'conventional' memory area, our new version 6 increases the amount of memory freed-up. Our exclusive 'optimize' feature automatically seeks out TSRs and device drivers and moves them into high memory—the area between 640K and 1 megabyte. All you need do is type 'OPTIMIZE'.

"It's nothing less than a dream come true"
—Steve Gibson InfoWorld 8/26/91



Our latest awards.

QEMM-386 v6 finds more high memory than any other memory manager. *Byte Magazine's* tests showed it produced net memory gains of 21K to 132K over DOS 5.0 alone, for instance.

Stealth takes you to network and TSR heaven.

Our breakthrough 'Stealth' technology makes available areas normally taken up by ROM. Areas that QEMM-386 can use to load memory-hogging drivers and TSRs. Big programs can get the memory they need to run fast and efficiently. And you get to have your TSRs.

Not every PC can benefit from Stealth. But every PC can benefit from

'Squeeze'—our new feature to accommodate those TSRs that need more memory at start up and less when they're resident. Memory allocation is temporarily increased, then squeezed down after it's needed.

QEMM can use idle video memory to produce a further 96K gain on EGA and VGA systems when running character-based programs.

A priceless \$60 bonus.

QEMM comes with Quarterdeck Manifest, the award-winning analysis program that shows what's going on 'under the hood' of your PC.



Manifest does for memory what Norton Utilities does for disks.

Big Benefits for Windows users, too.

Whether you're running DOS 3, 4, 5, or Windows, QEMM can improve your 386/486's performance.

That means you may not need a faster CPU. You may not even need more RAM. QEMM makes your favorite programs work better by giving them more memory.

QEMM helps you get the most out of the software you own today.

PC Week Ratings	All Charge 386.32	Netrom 2.18	QMAPS 2.0	386Max/BusMan 9.00	QEMM 6.01	Memory Commander 2.1
Software Compatibility	●	●	●	●	●	●
Hardware Compatibility	●	●	●	●	●	●
Reliability	●	●	●	●	●	●
Ease of Use	●	●	●	●	●	●
Memory Management	●	●	●	●	●	●
Flexibility	●	●	●	●	●	●
Quality of Documentation	●	●	●	●	●	●

PC Week rated QEMM 6 the best memory manager.



Quarterdeck

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire, Co. Dublin, Ireland Tel. (353) (1) 284-1444 Fax: (353) (1) 284-4380

©1992 Quarterdeck Office Systems. PC Week Analyst's Choice Logo. ©1991, Ziff Communications Company. PC Week is a registered trademark and the PC Week Analyst's choice logo is a trademark of the Ziff-Davis Publishing Company. Other trademarks are property of their respective owners. Key to comparison table: Software compatibility is defined as the product's ability to run without problems with the operating systems PC Week Labs used in testing. MS-DOS 5.0, IBM PC DOS 5.0 and Microsoft Windows 3.0, and with a variety of application software, including Quarterdeck's DESQview 2.40, Xerox Ventura Publisher 3.0 for DOS, WordPerfect 5.1 and Artisoft's LANtastic 4.0. Hardware compatibility is defined as the product's ability to run on PC Week Lab's test hardware platforms, which included a 33MHz 486-based PC and a 25MHz 386-based IBM PS/2 Model 70. Reliability ratings are based on the successful and dependable performance of each operating system and application software package under each memory manager. Ease of use is based on ease of installing and configuring each program, based on support for automatic loading features and the intuitive nature of the interface. Flexibility in managing memory is rated on the range and quality of the product's features in optimizing system performance and handling special-use installation. Quality of documentation is judged by the clarity, comprehensiveness and helpfulness of the documentation provided with the product, based on the organization of the manuals as well as the thoroughness of definitions, directives and explanations, and the inclusion of troubleshooting information.

CIRCLE 338 ON READER SERVICE CARD

dBASE IV 1.5: Borland's First Upgrade Keeps a Classic Alive—for Now

by Sal Ricciardi

Though Borland's first upgrade of *dBASE IV* includes a number of new functions and general improvements, it also retains the same look and feel as that of its predecessor. If you were hoping for a rewrite of *dBASE* or for an infusion of Borland's much touted object-oriented technology, you'll be disappointed. While Version 1.5 shows Borland's continued commitment to its *dBASE* customers (the company acquired Ashton-Tate in 1991), it shows only a little of what Borland can do in terms of technology.

The most noticeable change in the \$795 *dBASE IV*, Version 1.5, is mouse support. You can use the mouse in all Control Center operations: menu navigation, prompt boxes, and expression builders. The mouse is also supported in each of the work surfaces: the form designer, the report designer, the label designer, the application generator, and query by example (QBE). And you can use the mouse to move the cursor in a BROWSE and to move to specific fields in a data entry

form created using @...GET statements.

PLUG INTO THE CONTROL CENTER

Borland has opened up the architecture of the *dBASE* Control Center; there are now a number of places where you can plug in your own programs. For example, now you can substitute your favorite report writer or forms designer for the ones built into *dBASE*, and you can specify programs to be run on entry and exit from several Control Center menus and options.

The way you do this seems confusing at first glance, but it basically involves specifying your substitute programs via a number of keywords that you include in your CONFIG.DB configuration file. You can then select a specific file to use for your configuration file using the /c command line parameter.

Some improvements have been made to *dBASE*'s index handling repertoire. For example, Version 1.5 introduces a new REINDEX keyword that gives you more control over how an index is updated when certain scoped

commands are issued. For example, if you use the REPLACE command to make a large number of changes to a key field, specifying REINDEX postpones updating the associated index until after the replacements occur. This can be faster than updating the index after each record is changed.

dBASE is also smarter about how it otherwise updates indexes. In Version 1.5, *dBASE* assigns each index tag an internal marker to describe whether it should be updated after each record is changed or after an entire scoped operation is completed.

The new SET KEY TO command implements a smart key filter that lets you filter data based on an index expression. This is faster than the previous methods because it requires and uses an existing index to find the matching records. If your search expression includes an index expression, you'll get improved performance by using the SET KEY TO command.

Several new functions provide information about indexes. The DESCENDING() function indicates whether an index was created using the DESCENDING keyword. A FOR() function indicates whether an index tag was created using the FOR option. TAGCOUNT() and TAGNO() return the number of active indexes in a specified .MDX and the position of a specified index in the list of active indexes, respectively. Finally, the UNIQUE() function indicates whether an index was created using the UNIQUE option.

LIFTING THE LIMITS

With previous versions of *dBASE*, you could not open more than ten tables simultaneously. Version 1.5 lifts that constraint, providing room for up to 40 database work areas. Developers who have had to juggle ten work areas will find this a welcome change.

Another limitation has been the availability of only a single procedure file, specified using SET PROCEDURE TO, for storing commonly used procedures and functions. Version 1.5 offers two alternative procedure files. The first, specified using a new CONFIG.DB keyword called SYSPROC, lets you specify a



FACT FILE

dBASE IV, Version 1.5

Borland International Inc., P.O. Box 660001, 1800 Green Hills Rd., Scotts Valley, CA 95066; 800-331-0877.

List Price: \$795; LAN Pack (for a single user), \$395; for 10 users, \$3,945.

Requires: 512K RAM, 3.5MB hard disk space, DOS 3.1 or later.

In Short: An improved version of *dBASE IV*, but not the long-awaited modernization of *dBASE*. Of the most important advances: strong cross-platform support.

CIRCLE 424 ON READER SERVICE CARD

high-level library of procedures that takes precedence over everything except internal *dBASE* commands. *dBASE* will search the SYSPROC library immediately when it doesn't recognize a command or function as a built-in *dBASE IV* command or function.

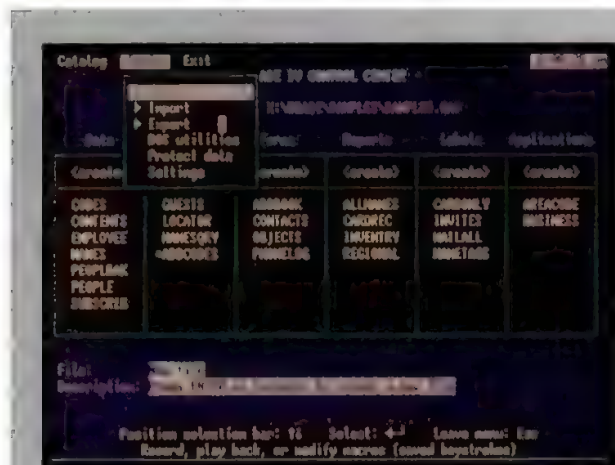
A second alternative, accessed using the new SET LIBRARY TO command, lets you specify a procedure library that is searched last, only after all other attempts to find a match are exhausted.

The new release also includes conditional compilation directives that let you selectively include or exclude code depending on which operating system platform you are compiling for.

Other improvements include new low-level file I/O functions; support for passing a variable number of parameters to a procedure or function; the ability to determine whether or not a field is blank (versus null); an improved RUN function that swaps to disk all but 10K of *dBASE*, leaving more room to run external programs; and the ability to specify an error level on the QUIT command.

Even with all of these welcome enhancements, *dBASE IV* still isn't state of the art. For end users, Borland's other database, *Paradox*, is more intuitive and easier to use. For Xbase developers, *FoxPro*, *Clipper*, and *Arango* offer more important features.

With Version 1.5 of *dBASE IV*, Borland is basically asking you to remain loyal while it brings *dBASE* up to date. The question is, can you wait?



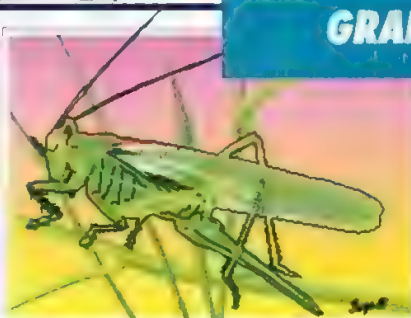
dBASE IV 1.5 includes new mouse support that can be used throughout the Control Center and with all the data and design work surfaces.

Finish Faster!

SPREADSHEETS

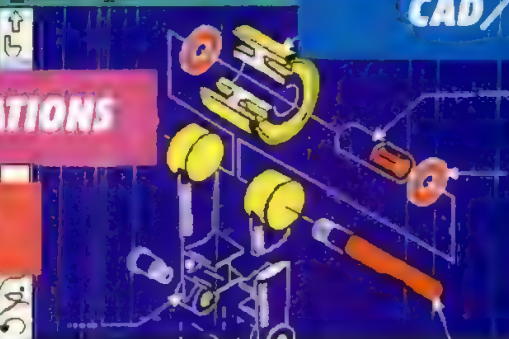
	B	C	D	E	F	G	H	I	J	K
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
6	30	20	57	89	179	245	169	389	234	157
7	15	39	47	19	23	187	344	256	168	27
8	12	50	30	120	127	239	139	139	120	256
9	88	140	234	368	259	324	330	255	380	655

GRAPHICS



CAD/CAE

File Edit Draw View Change Arrange Line
Pattern Text



AND OTHER KEY BUSINESS APPLICATIONS

IN A FRACTION OF THE TIME!

with IIT's Advanced Math CoProcessor



Tough applications slowing you down? IIT's Advanced Math CoProcessor is a simple addition to your system that can instantly speed up performance by up to five times or more!

Guaranteed to be fully compatible with all 286, 386DX, or 386SX systems and software, IIT's Advanced Math CoProcessors run up to 2x faster and use 25% less power (perfect for portables!) than the leading competitor's.

And best of all, IIT warrants every Advanced Math CoProcessor for the lifetime of your system!

Put an Advanced Math CoProcessor to work for you today, and finish faster!

Call now for more information—1-800-832-0770 or 408-727-1885.

IIT INTEGRATED
INFORMATION
TECHNOLOGY

NEC Puts Local Bus Video On 486, Doubles Windows' Performance

HANDS ON
by Ben Myers

One of the pioneers in local bus graphics, NEC, has again busted the 8-MHz I/O bottleneck, this time giving Windows access to 33-MHz video performance. First there was the NEC PowerMate SX/20i, which held the promise of dramatic speed gains once drivers were optimized for Windows. (See First Looks, November 12, 1991.) Now, NEC has engineered a compact yet powerful 33-MHz 486 workstation, the PowerMate 486/33i, distinguished by its local bus graphics on the motherboard.

The basic PowerMate 486/33i has a retail price of \$3,799 with a 120MB IDE hard disk and \$4,049 with a 240MB hard disk. A complete system with a 15-inch MultiSync flat-screen color

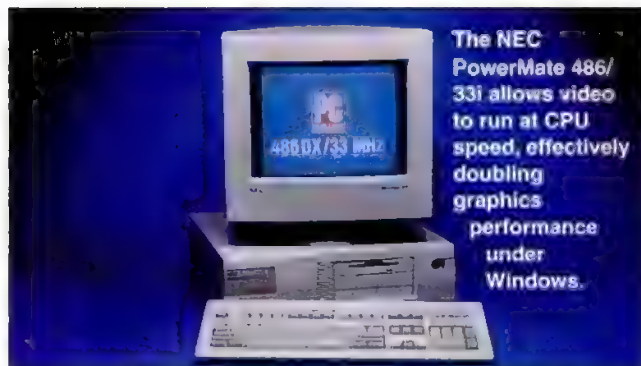
monitor and a mouse costs just under \$4,800. The machine is quite compact, measuring 5.5 by 17 by 16 inches (HWD) and tipping the scales at 17 pounds.

Known for innovative design, NEC made the system lightweight by using plastic materials reinforced by sheet metal. The latter also serves as an effective emissions barrier, earning the system an FCC Class B rating.

MOTHERBOARD VIDEO

By integrating the latest revision of Tseng Laboratories' ET-4000 Super VGA graphics chip onto the motherboard, NEC has more than doubled graphics performance under Windows. It achieves this gain by allowing video to run at CPU speed. (See Trends, February 11, 1992.)

The PowerMate 486/33i has other features that also rev up



performance. Inside the compact chassis is a Quantum IDE hard disk that yields snappy performance from a 256K drive cache, an average seek time in the low teens (ms.), and a faster-than-normal rotational speed of 4,300 rpm. (Most hard disks rotate at 3,600 rpm.) The basic system depends on the 8K cache memory built into the 486DX, but it allows for 64K or 128K cache memory snap-in modules to increase processor power.

Though the architecture of the PowerMate 486/33i emphasizes performance, it won't short-change you in convenience features. NEC preloads DOS 5.0 and Windows 3.0 on the system disk. Setting up the machine takes less than 10 minutes, in contrast to the typical hour needed to set up DOS and Windows.

The front of the system unit gives easy access to IBM PS/2-style connectors for both the keyboard and the mouse. External connectors for a Super VGA monitor, a parallel port, a serial port, an internal IDE disk, and floppy disk drive connectors are also on the motherboard. The basic system includes 4MB of RAM and accepts up to 32MB of additional memory in the form of either 1MB or 4MB standard SIMMs. With two openings on the front of the case for external audio connectors, the system is ready for a multimedia sound board upgrade.

UPGRADABLE BIOS

The system BIOS is stored in flash EEPROM, a rewritable form of read-only memory. This flexibility lets you install BIOS upgrades by running a utility supplied by NEC rather than pulling the old BIOS ROMs and installing new ones—a task not recommended for novices.

You don't need any tools to pop open the case on the 486/33i, and the inside is organized to permit easy installation of SIMMs or a cache memory upgrade kit. Despite the small case, the 486/33i has plenty of room for expansion, with four 16-bit ISA bus slots and space for three internal devices: an additional IDE hard disk and two devices that require access from the front. ISA bus add-in cards are installed laterally into a back-board card, parallel to the baby motherboard.

The 110-watt power supply may not be powerful enough for a system fully loaded with memory, add-in cards, and internal devices.

If you like the combination of a small form factor with plenty of horsepower, the PowerMate 486/33i is an excellent choice. Windows power users in particular will appreciate the responsiveness of its local-bus graphics.

FACT FILE

PowerMate 486/33i
NEC Technologies Inc., 1414 Massachusetts Ave.,
Boxborough, MA 01719; 800-632-4636; 508-264-8000
List Price: With 4MB RAM, 1.44MB floppy disk drive, \$3,299; with 120MB IDE hard disk, \$3,799; with 240MB IDE disk, \$4,049; 64K secondary cache, \$159; 128K secondary cache, \$249; MultiSync 15-inch 3FGx monitor, \$799; 15-inch 4FG, \$949; 17-inch 5FG, \$1,699
In Short: The PowerMate 486/33i offers plenty of Windows-ready power in a small form factor. Its leading-edge local-bus Super VGA graphics can double Windows' speed.

CIRCLE 426 ON READER SERVICE CARD

BENCHMARK TESTS: NEC POWERMATE 486/33i

As demonstrated by PC Labs' WINMARK, the NEC PowerMate 486/33i more than doubled the performance of the ATI VGAWonder XL under Windows, thanks to NEC's local-bus video implementation of the Tseng Laboratories ET4000 Super VGA video controller. And by running video I/O at system speed, the 33-MHz NEC also beat the Compaq Deskpro 486/50M and its faster 486 DX2 processor in hardware video operations, since Compaq's video, although optimized, performs data transfers at the expansion bus's 8-MHz speed limit.

PC Magazine Labs' Hardware Performance Tests, Release 6.0, measure the PC's processor, memory, disk, and video subsystem performance. For a description of the individual tests, see page 38.

With the release of Version 2.5 of PC Labs' WINBENCH (our graphics performance tests for Microsoft Windows), PC Labs has introduced a new method of measuring graphics performance. WINMARK is the geometric mean of 11 WINBENCH graphics tests, reported in pixels per second. PC Labs profiled the major Windows applications in November 1991 and determined which graphics functions are most frequently used within Windows. WINMARK takes into account 11 tests of these key functions and weights them to reflect how frequently the functions are used. Windows applications also use other graphics functions, but far less often.

We performed all WINBENCH 2.5 tests under Microsoft Windows 3.0 running in 386 Enhanced mode. For comparison, PC Labs tested a Gateway 486/33C with 8MB RAM running the ATI VGAWonder XL, a previous Editors' Choice.

Higher scores represent better performance	WINMARK (pixels per second)
NEC PowerMate 486/33i	5,008.195
ATI VGAWonder XL	1,971.144

Higher scores represent better performance	Processor (operations per second)	Memory (kilobytes per second)	Video (thousands of operations per second)
Compaq Deskpro 486/50M	523.51	7,688.61	5,922.13
NEC PowerMate 486/33i	348.05	5,081.64	8,794.80

This "Ultimate-Power
Desktop PC" was chosen
Editors' Choice.

Here's why.

MAGAZINE
EDITORS'
CHOICE
2-11-92

More Power.



own *Editors' Choice* system!

It's the ZEOS Editors' Choice 486DX-33. Quite simply, there is nothing else like it. *PC Magazine* said, "the race toward 486 systems is faster than expected." One good reason for that is our *ZEOS Editors' Choice 486-33*. Go with the ZEOS '486 if you want the type of quality, performance and value that makes an *Editors' Choice* machine. And if it's 50MHz you've been dreaming about, dream no more.

Because right here, right now, ZEOS gives you the option of '486 50MHz power! We're talking power unlike anything you've seen before. Take either the ZEOS 486DX2-50 or the 486DX-50. Absolutely unbelievable *performance!* And the price? That's what you really won't believe; only a couple hundred dollars more than the ZEOS 486-33. *Amazing.*

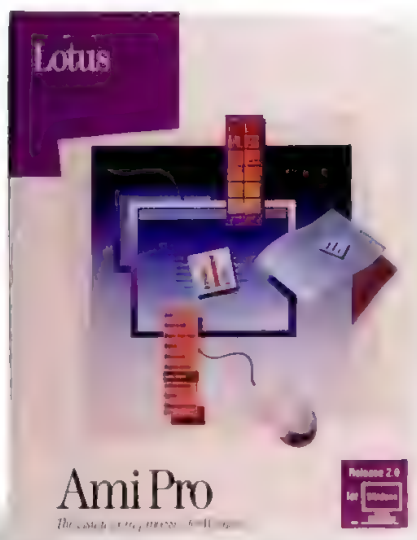
AND THAT'S JUST FOR STARTERS.

Because ZEOS combines the high speed upgradable processor of your choice with some of the fastest DRAM made. Both

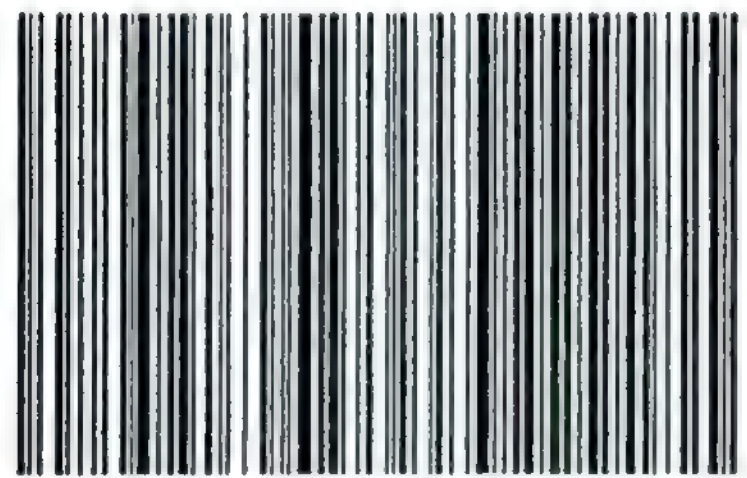
are mounted on your ZEOS system board, one of the most advanced in the industry. And that's where your new system really begins to shine.

Because to this we add an *incredibly fast* IDE hard drive and genuine Teac[®] floppy drives. We have located the ports for these drives right on the motherboard along with your serial, parallel and game ports. The result? Two slots are saved, giving your new ZEOS system a total of *eight*. All this while others are trying to get you to accept fewer slots. It's part of your ZEOS expansion advantage. The slots to expand, how about the room?

This is where ZEOS has performed something akin to magic. We call it our SpaceSaver case. Complete with *seven* drive bays (six with the DX-50), this incredible case is actually smaller than many cases offering only five drive bays. Plus, we've also added a *second whisper-quiet cooling fan*. Why? Because the cooler a system runs the longer it will last. Now



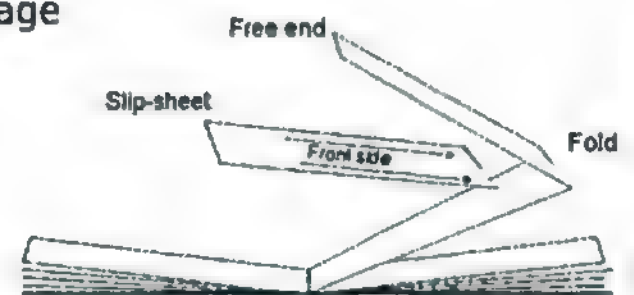
Inverted Foldout slip-sheet



GbsSlipSheet-001

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



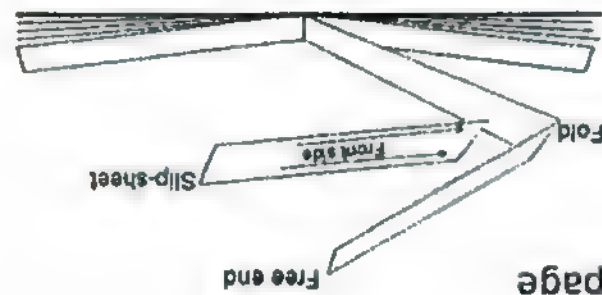
Open the foldout page
Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

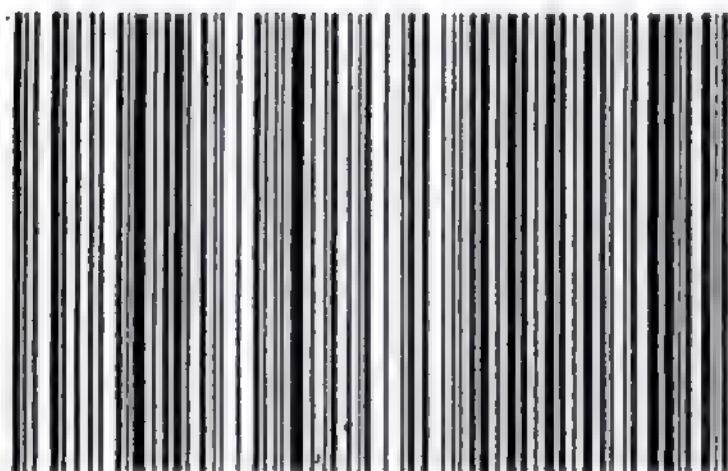
3. Slice the folded edge

4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



GbsSlipBack-0018

Back

1. Follow instructions on the other side

PC Magazine calls it "the ultimate-power desktop PC." What will you call your new **ZEOS '486 Editors' Choice** system? Probably the hottest computer you've ever owned! And that's just for starters.

Because never before has so much value been available for so little money. We call it **ZEOS Value**. Starting with the incomparable **ZEOS**

386-33 right up thru our two new 486-50s. **ZEOS** gives you more for your



ZEOS. Nine times Editors' Choice. Your Best Choice as Well!



cations: *Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance Graphics*. These are not trial copies or sample discs; they are full blown, fully documented production packages. And, with a suggested retail of over \$1,000, even at "street prices" that's a *great* value. It's **ZEOS** value. After all, **ZEOS** sets the pace for innovation and value for you in the direct marketing channel. Here's another good example.

Upgradable.

money than anyone else.

First of all, our prices are great! You can get a **ZEOS 386-33** upgradable for as little as \$1,395. Or you can move right into a *complete 486DX2-50MHz for only \$1,995*. Outrageous! And it's not just the price. It's all the extras we give you, too.

As an example, your new **ZEOS Windows** system comes complete with your choice of 2 out of 3 great Windows appli-



ZEOS COMPLETE SYSTEM PACKAGE #1

- The processor and speed of your choice plus future upgradability!
- 1MB of high-speed RAM, expandable to a system total of 32MB right on the motherboard.
- 42MB high-speed IDE hard drive with its own cache.
- 1.2MB or 1.44MB Teac® floppy drive.
- ZEOS 14" flat screen Hi-Res amber monitor with Tilt/Swivel Base.
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101-key SpaceSaver keyboard.
- Two serial, one parallel & one game port built right onto the motherboard.
- 7-16, 1-8 bit expansion slots. 80387 math coprocessor support for '386 systems.
- Rugged ZEOS SpaceSaver case with twin cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 watt power supply with built-in surge suppressor!
- Includes ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction package.

PACKAGE #1

INCREDIBLE ZEOS PACKAGE #2

We take Package #1 and upgrade your ZEOS Modular System to include:

- 2 full Megabytes of rip-roaring RAM.
- Our incredible 107MB IDE hard drive with its own built-in cache.
- Both the Teac® 1.2MB and 1.44MB floppy drives.
- Diamond Stealth Hi-Color VGA card/1MB RAM & Sierra DAC plus WinRIX drawing software!
- ZEOS 14" High-Res VGA mono monitor with Tilt & Swivel Base.
- MS Mouse, Windows and DOS, plus 2 out of 3: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance!

PACKAGE #2

486DX-50	\$2195
486DX2-50	\$1995
486DX-33	\$1795
486SX-25	\$1695
486SX-20	\$1595
386-33	\$1395

486DX-50	\$2695
486DX2-50	\$2495
486DX-33	\$2295
486SX-25	\$2195
486SX-20	\$2095
386-33	\$1895

ZEOS.

ZEOS is the best computer for your money, no matter how much you spend. Why?

Because ZEOS delivers to you high performance, fully compatible systems with more quality and features than anyone else. Not only that, but our after-the-sale support is second to none. And the prices? They're best described as incredible! It's no wonder *PC Magazine* has awarded ZEOS systems the coveted *Editors' Choice* nine times. Your new ZEOS Editors' Choice '486 is no exception.

After all, the ZEOS '486 upgradables are the hottest systems on the market today. As *PC Magazine* says, "it's a lot of computer for a little cash." And that's an understatement! No matter how much power you're looking for, ZEOS has it for you.

ANNOUNCING THREE HOT NEW PROCESSOR OPTIONS: '486SX-25, '486DX2-50 AND '486DX-50!



Go ahead and Pick your Power! ZEOS gives you all the options. You can start out by taking a look at the de facto desktop power standard, the 386DX-33. Our '386-33 workhorse is a great entry point for true desktop power computing. But if it's a '486 you're after, hang on to your hat!

Because you're off to a fast start with a 486SX-20 or our brand new 486SX-25. The 486SX is like a 486DX without the built-in math coprocessor. It's the easiest way to own the '486. And for full blown 486DX power, why not opt for your

You have probably heard about the importance of protecting your new computer investment with a surge suppressor. Well, your new ZEOS upgradable desktop system already has one. *Built into the power supply!* That's innovation, built in from ZEOS.

Your new ZEOS system really is unlike anything else you can buy. It's better. Whether it's performance, quality, compatibility, upgradability, expandability, reliability, safety or support — whatever it is that you look for in a system, ZEOS has it. Here's another innovation we introduced to

Choose 2 out of 3: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance Graphics — no extra charge!



Low Cost.

Choose
the Editors'
Choice
Upgradable.
Now available as a
485-501

the hardware industry.

24-Hour-a-Day Toll-Free Technical Support. While most of the others still only offer part-time technical support, as a ZEOS customer, you get around-the-clock 24-Hour-a-Day support, 365 days a year. Not that you'll need the help. But it's comforting to know if you do have a question, all you have to do is pick up the phone and give

us a call, *any time* of the day or night!

And all of this is just for starters. Because when you turn the page we're going to talk about a lot of other very exciting and important reasons for you to buy from ZEOS. Like 486SX-25s, the new 486DX2-50, your ZEOS *Editors' Choice* '486 and more. A whole lot more. *Come on in!*



confidence in support, in your system and in the company as well. You can buy with confidence too because ZEOS is a strong and rapidly growing public company (NASDAQ NMS Symbol: ZEOS). In fact, *Fortune* magazine rated ZEOS as *America's Fastest Growing Company*.

Price, Performance. Quality and Support. There are *many* reasons to buy your new ZEOS system. All of them backed by your ZEOS Customer Satisfaction Package which includes our 30-Day Money-Back Guarantee, One Full Year Limited Warranty and Express Parts Replacement Policy. How do you get one?

ORDERING IS EASY!

Ordering your new ZEOS system is indeed easy. Simply pick the



486DX-50 \$3195

486DX2-50 \$2995

486DX-33 \$2795

486SX-25 \$2695

486SX-20 \$2595

386-33 \$2395

loaded!

486DX-50 \$3695

486DX2-50 \$3495

486DX-33 \$3295

486SX-25 \$3195

486SX-20 \$3095

386-33 \$2895

Power and Package you want or let us custom build your new system to your exact specifications! Whatever you decide, a friendly and knowledgeable ZEOS Systems Consultant is waiting to assist you. And whatever you select, one thing is for certain.

Buying your new ZEOS system is perhaps the best purchase decision you'll ever make. So why not give us a call right now. You're going to be very satisfied. We don't just say it. We guarantee it! *Call Now Toll Free, 800-423-5891.*

INCREDIBLE ZEOS PACKAGE #3

Add even more memory, a larger drive. And more savings! You now receive:

- 4 full Megabytes of ultra-high-speed RAM.
- Our fast 130MB IDE hard drive with built-in cache.
- Teac® 1.2 & 1.44MB FDD'S!
- Diamond Stealth Hi-Color VGA card/1MB RAM (32,000+ colors) plus WinRIX drawing software!
- ZEOS 14" 1024x768 non-interlaced VGA Color monitor w/Tilt & Swivel.
- MS Mouse, Windows and DOS, plus 2 out of 3: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance!

PACKAGE #3

THE ULTIMATE ZEOS PACKAGE #4

Now, memory goes to 8MB and the drive to 210MB. PC Magazine Editors' Choice as a 486DX-33 Vertical!

- 8 full Megabytes of high-speed RAM.
- Your screaming 210MB IDE hard drive with its own built-in cache.
- Teac® 1.2 & 1.44MB FDD'S!
- Diamond Stealth Hi-Color VGA card/1MB RAM (32,000+ colors) plus WinRIX drawing software!
- ZEOS 14" 1024x768 non-interlaced VGA Color monitor w/Tilt & Swivel.
- MS Mouse, Windows and DOS, plus 2 out of 3: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance!

PACKAGE #4

ORDER NOW TOLL FREE
800-423-5891

Fax Orders: 612-633-1325
Govt.: 800-245-2449
Outside U.S. and Canada
Call: 612-633-6131
Hearing Impaired (TDD):
800-228-5389
MasterCard, VISA, Discover,
Am Exp, Z-CARD, COD and
Leasing Programs.
GSA #GS00K91AGS5176
Open 24 Hours a Day,
365 Days a Year!

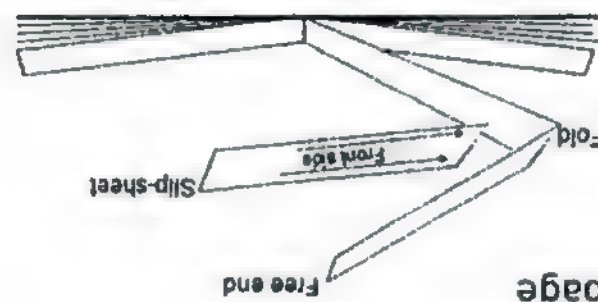
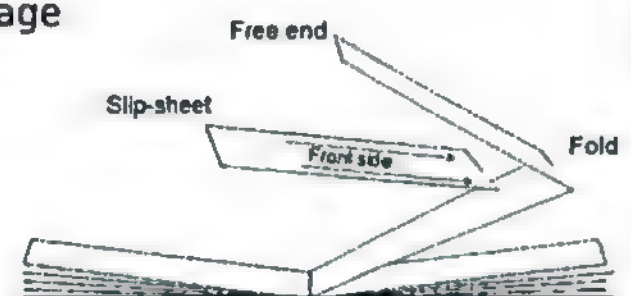
Inverted Foldout slip-sheet



GbsSlipSheet-001

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Front side touching the free page

2. Arrow pointing to the fold

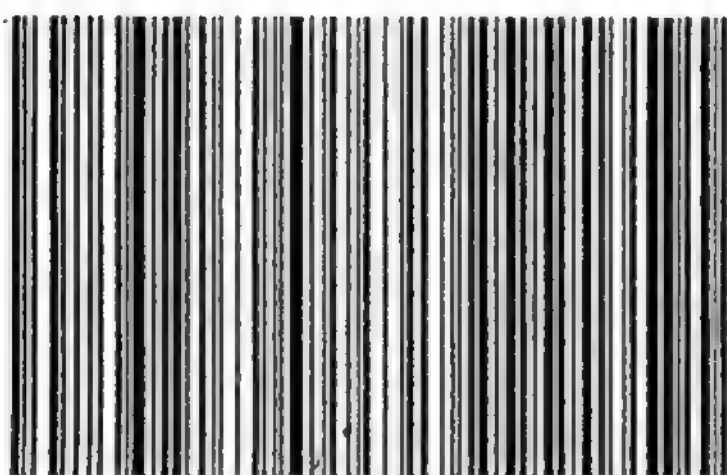
3. Slice the folded edge

4. Close the page and slip-sheet

Open the foldout page
Insert this sheet with

1. Follow instructions on the other side

Inverted Back



GbsSlpBack-0018

Back

1. Follow instructions on the other side

that's ZEOS Value. Speaking of which, here's another industry first you will definitely benefit from.

ZEOS ANNOUNCES: BUILT-IN SURGE SUPPRESSION!

Right now, ZEOS is proud to announce that we've taken our top-of-the-line *300 watt* supply and added a *built-in surge suppressor*. Building the surge suppressor right into the power supply increases reliability and helps protect your investment. We wonder how long it will take for the rest of the industry to catch up. And while ZEOS is giving you critically important features like these, we add yet another.

UL* Listing! As *PC Magazine* said, UL Listing is "one of the few forms of peace of mind you can buy." Every ZEOS system is Underwriters Laboratories Listed. This means your entire system (not just the power supply) has met the stringent safety requirements of Underwriters Laboratories. Not only that, but your

ZEOS UL listing says a lot about quality too. UL safety listings are something many of our competitors simply don't (or can't) provide you. At ZEOS quality and safety are important to us. *You are important to us!*

24-HOUR-A-DAY TOLL-FREE TECHNICAL SUPPORT.

The importance of having you as a customer shows in many other ways as well. For example, at ZEOS we believe supporting *you* should be more than a part-time proposition. As *PC Magazine* said, "Insist on a good service and support package. Expect...24-hour seven-day-a-week support." We've been saying that for years. In fact, it was ZEOS that invented *24-Hour-a-Day Toll-Free Sales and Technical Support*. Our customers tell us they love it. And you will too. Any time you need assistance, a ZEOS technician is only a phone call away.

With ZEOS you can have complete

Great Prices. L



**Now Pick 2: Lotus 1-2-3
for Windows, Ami
Pro 2.0 and/or
Freelance
Graphics!**

ZEOS COMPLETE SYSTEM PACKAGE #1

- The processor and speed of your choice plus future upgradability!
- 1MB of high-speed RAM, expandable to a system total of 32MB right on the motherboard.
- 42MB high-speed IDE hard drive with its own cache.
- 1.2MB or 1.44MB Teac® floppy drive.
- ZEOS 14" flat screen Hi-Res amber monitor with Tilt/Swivel Base.
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101-key SpaceSaver keyboard.
- Two serial, one parallel & one game port built right onto the motherboard.
- 7-16, 1-8 bit expansion slots. 80387 math co-processor support for '386 systems.
- Rugged ZEOS SpaceSaver case with twin cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 watt power supply with built-in surge suppressor!
- Includes ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction package.

INCREDIBLE ZEOS PACKAGE #2

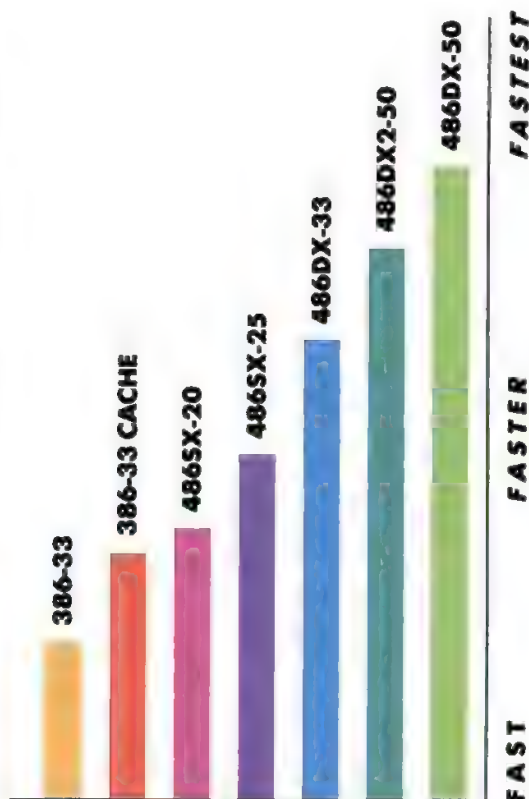
We take Package #1 and upgrade your ZEOS Modular System to include:

- 2 full Megabytes of rip-roaring RAM.
- Our incredible 107MB IDE hard drive with its own built-in cache.
- Both the Teac® 1.2MB and 1.44MB floppy drives.
- Diamond Stealth Hi-Color VGA card/1MB RAM & Sierra DAC plus WinRIX drawing software!
- ZEOS 14" High-Res VGA mono monitor with Tilt & Swivel Base.
- Microsoft Mouse, Microsoft Windows and DOS, plus 2 out of 3 Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance Graphics!

Now, ZEOS lets you pick exactly the power you want for the price you want to pay. Simply match the processor with the package configuration and you have your price. Or if you wish, we will custom build any system to your exact specifications.

And don't forget, with every ZEOS Windows System (packages 2, 3 and 4) you'll also receive your choice of 2 out of 3: *Lotus 1-2-3 for Windows*, *Ami Pro 2.0*, and/or *Freelance Graphics*. The Lotus software alone carries a suggested retail of over \$1,000 and even street prices are over \$700. Yet we're giving it to you at *no additional charge!* That's ZEOS value.

No doubt about it. ZEOS has broken the price/performance



Z-SPEED GRAPHOMETER

Let the "Z-Graphometer" help you pick the processing power that's right for you. The comparisons are easy to make. Fast, Faster or Fastest!

Pick Your Power!

Or
Customize, Customize,
Customized!
Just Tell Us and
We'll Do It.

barrier with these great new upgradables, and you're the beneficiary. Incredible power, upgradability, and free software. What more could there be? From ZEOS, lots more.

Because your new ZEOS system is not only fast, it's absolutely loaded with features. Like our 300 watt power supply with *built-in surge suppression*, eight expansion slots, twin cooling fans for even more reliability, plus our unique seven-bay SpaceSaver case. And, every ZEOS system is UL® listed.

And don't forget you're also receiving 24-Hour-a-Day Toll-Free Technical Support, our 30-day Absolute Satisfaction Money-Back Guarantee, Express Parts Replacement and more. So go ahead.

Pick your Power, your Package, and your Price and give us a call. Your friendly, expert ZEOS Systems Consultant is ready to answer any questions you may have. *Call Now Toll Free 800-423-5891.*

PACKAGES 2, 3 AND 4 INCLUDE LOTUS BUNDLE!

	Pkg. #1	Pkg. #2	Pkg. #3	Pkg. #4
386-33	\$1395	\$1895	\$2395	\$2895
486SX-20	\$1595	\$2095	\$2595	\$3095
486SX-25	\$1695	\$2195	\$2695	\$3195
486DX-33	\$1795	\$2295	\$2795	\$3295
486DX2-50	\$1995	\$2495	\$2995	\$3495
486DX-50	\$2195	\$2695	\$3195	\$3695

Add \$200 to any price for a 128K cache. 486DX-50 SpaceSaver case has 6 bays.

PICK YOUR PAYMENT OPTION TOO:

When you buy from ZEOS you have a wide variety of payment options. We accept MasterCard, VISA, American Express and Discover cards, or if you wish we can ship COD.

We also have our own ZEOS credit card, the Z-Card™. The Z-Card allows you to charge your ZEOS purchases just like a MasterCard or VISA. There is a low consumer rate and there is no annual fee. We can send you an application or you can apply right over the phone. Our special toll-free application number is 800-421-8942.

ZEOS also offers a terrific leasing program for businesses. The rates are lower than those charged by most of the others in our industry. We will promptly mail or fax you an application on request. Just give us a call at 800-423-5891.

Purchase orders from Fortune 1000 companies, governments and institutions are subject to credit approval. Wire transfer is also available. Please call 800-423-5891 for details.

INCREDIBLE ZEOS PACKAGE #3

Add even more memory, a larger drive. And more savings! You now receive:

- 4 full Megabytes of ultra-high-speed RAM.
- Our fast 130MB IDE hard drive with built-in cache.
- Teac® 1.2 & 1.44MB FDD'S!
- Diamond Stealth Hi-Color VGA card/1MB RAM (32,000+ colors) plus WinRIX drawing software!
- ZEOS 14" 1024x768 non-interlaced VGA Color monitor w/Tilt & Swivel.
- Microsoft Mouse, Microsoft Windows and DOS, plus 2 out of 3 Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance Graphics!

THE ULTIMATE ZEOS PACKAGE #4

Now, memory goes to 8MB and the drive to 210MB. PC Magazine Editors' Choice as a 486DX-33 Vertical!

- 8 full Megabytes of high-speed RAM.
- Your screaming 210MB IDE hard drive with its own built-in cache.
- Teac® 1.2 & 1.44MB FDD'S!
- Diamond Stealth Hi-Color VGA card/1MB RAM (32,000+ colors) plus WinRIX drawing software!
- ZEOS 14" 1024x768 non-interlaced VGA Color monitor w/Tilt & Swivel.
- Microsoft Mouse, Microsoft Windows and DOS, plus 2 out of 3 Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0, and/or Freelance Graphics!

ORDER NOW TOLL FREE 800-423-5891

FAX Orders: 612-633-1325
Govt.: 800-245-2449

Outside U.S. and Canada
Call: 612-633-6131

Hearing Impaired (TDD):
800-228-5389

MasterCard, VISA, Discover,
Am Exp, Z-CARD, COD and
Leasing Programs.

GSA #GS00K91AGS5176
Open 24 Hours a Day,
365 Days a Year!



If you thought power like this was out of your budget, take another look. While many of the others don't even offer 50MHz power, you can own the new ZEOS 486DX2-50 starting *complete for as low as \$1995!*

Starting at \$1995, you can select from any of four money-saving ZEOS System

100+ megabytes; applications just don't seem to be shrinking (however, before you go too wild, remember you can always add more drives). Both of our Packages #3 and #4 incorporate these suggestions.

Certainly another option you may want to consider is our Vertical case. This heavy-

ZEOS POWER GRID FOR THE 486DX2-50

Apply The "Zeos Power Grid" To Match Your 50MHz Needs. Add \$200 for 128K cache. Prices shown are for Intel 486DX2-50 CPU; for 486DX-50 add \$200.

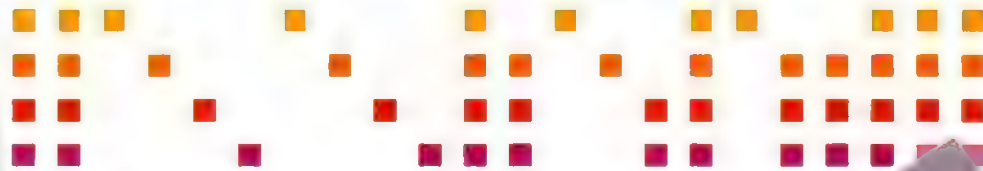
Intel 80486DX2-50MHz
Upgradable CPU
1MB High Speed RAM
2MB High Speed RAM
4MB High Speed RAM
8MB High Speed RAM
42MB HDD, Fast IDE
107MB HDD, Fast IDE
130MB HDD, Fast IDE
210MB HDD, Fast IDE
Teac 1.2 Floppy Drive
Teac 1.44 Floppy Drive
14" Hi Res TTL Monitor
14" VGA Mono Monitor
Monitor Tilt & Swivel
Hercules® Graphics Card
Hi-Color VGA Card
Sierra DAC
Shadow RAM/EMS Support
ZEOS/RS 101 keyboard
2 serial, 1 parallel,
1 game port

Pkg. #1 Only \$1995

Pkg. #2 Only \$2495

Pkg. #3 Only \$2995

Pkg. #4 Only \$3495

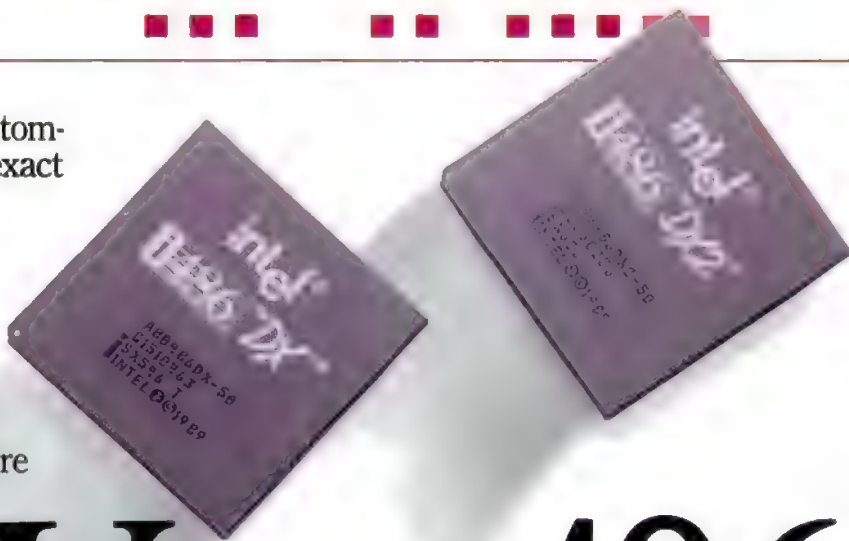


Packages. Or, if you wish, let us custom-build your hot new 486-50 to your exact specifications.

WHAT SHOULD I GET?

How should you configure your new ZEOS 486-50? Of course the best answer depends on your needs and what you plan to use your new system for. But never before has so much power been available to everyone at such a low price. Our suggestion would be to consider investing in two areas when you buy your new 50MHz system. The memory and drives. Particularly the memory.

From what we're hearing, memory will be important with the new operating systems debuting later this year. We would strongly recommend at least 4 megabytes, eight if it's in the budget. As for drives, think in terms of



Your 486

ZEOS Breaks the '486-

duty case holds more drives than most others and has a top-notch power supply and plenty of cooling.

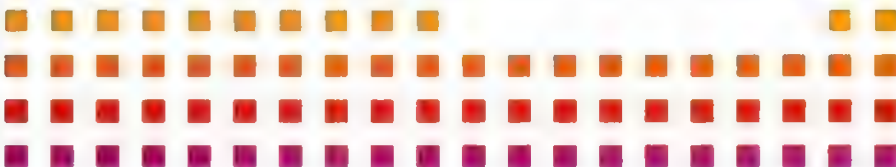
It really is quite a buy. The power supply is the *TurboCool 300 watt* unit (check the retail price of the power supply

alone if you really want to see what a good deal you're getting). It's well worth considering.

YOUR ZEOS EXTRAS. NO EXTRA CHARGE.

And don't forget, if you purchase a ZEOS Windows system we'll also include

746, 18 bit expansion slots
300 Watt Power Supply
Built-in Surge Suppression
ZEOS SpaceSaver Case
Two cooling fans
24-Hour Tech Support
System UL* Listed
FCC Class B
30-Day Money-Back Guarantee
1 Full Year Limited Warranty
Microsoft DOS
Microsoft Windows
Microsoft Mouse
Lotus 1-2-3 for Windows*
Freelance Graphics*
Ami Pro 2.0 for Windows*
Adobe Type Manager
WinRIX Drawing Package
100's of Other Options
24-Hour Sales
800-423-5891



*Pick 2 of 3

Consider the Vertical Option. We can build your new upgradable system in our eight bay vertical case. It comes complete with the 300 watt TurboCool power supply and two cooling fans. Add only \$150.

your choice of 2: *Lotus 1-2-3 for Windows*, *Ami Pro 2.0*, and/or *Freelance Graphics*. You'll be getting all the other ZEOS extras too.

If you don't go with the Vertical case, we'll send your 486DX2-50 in our seven-bay SpaceSaver case (the 486DX-50 has 6 bays); it's complete with our top quality 300 watt power supply, *built-in surge suppressor*, and two whisper-quiet cooling fans.

Remember too, ZEOS also provides you with 24-Hour Support, our 30-Day Money-Back Guarantee, One Full Year Limited Warranty and our Express Parts Replacement Policy.

Ordering your new ZEOS 486DX2-50 is easy. Simply

give us a call. You're going to love your new ZEOS '50. And that's a guarantee! Call now Toll Free 800-423-5891.

DX2-50!

50MHz Price Barrier!

Computers Now! SM

Take Your Pick. We'll Ship Today!

RIGHT NOW. GUARANTEED!*

Yes, we can ship your new ZEOS '386 or '486 today! We've built up an extra supply of the hottest selling computers in America in their most popular configurations.

Here's how it works. We have these incredible ZEOS '386 and '486 color VGA systems pre-built and ready to ship. While supplies last, we will ship any of these systems to you *the day you order* subject to these conditions:

1. Your order must be received by 1PM Central Time M-F.
2. Credit Cards are subject to authorization.
3. Orders must be for ZEOS '386 or '486 systems configured as shown here. Any other systems or upgrades are custom-built and will take slightly longer.

*OUR GUARANTEE TO YOU:

If we accept your order for immediate shipment and fail to ship your system under the conditions outlined, we will ship it at *our expense* as soon as it is ready.

This offer is good only as long as these pre-built systems remain in stock; please give us a call to verify availability. This offer does not apply to other ZEOS systems or custom configurations.

IMMEDIATE SHIPMENT IS ONLY PART OF THE STORY.

These are not just any computer systems. They're the high performance, high quality ZEOS *upgradable* systems. Packing all the ZEOS value that has won PC Magazine Editors' Choice—*nine times!*

So why not give us a call right now. If we hear from you by 1:00 this afternoon, we'll get your new system on the way to you today! Call now Toll Free 800-423-5891.



**Yes! We can ship
your new ZEOS system
Right Now!
Place your order
by 1:00 PM Central
Time and we'll ship
today. Guaranteed!***

Our most popular '386 & '486 packages! 128K Cache, 130MB Drive, 4MB Memory and More. Ready to ship today!

**'386-33 ONLY \$2595.
As a '486-33 ONLY \$2995!**

- Upgradable CPU module allows you to change processors as your computing needs change!
- Ultra high-speed zero-wait 128K SRAM cache.
- 4MB of zero-wait DRAM, expandable to a total of 32MB on the motherboard.
- Ultra fast 130MB IDE hard drive.
- 1.2MB and 1.44MB Teac® floppies.
- ZEOS 14" high res 1024x768 non-interlaced VGA color monitor with Tilt/Swivel base.
- Incredible Diamond Stealth Hi-Color VGA graphics card with 1MB RAM and Sierra DAC (32,000+ colors) *plus* WinRIX drawing software!
- Microsoft Mouse, Microsoft Windows and DOS, plus 2 out of 3 Windows software packages: Lotus 1-2-3, Ami Pro 2.0, and/or Freelance Graphics!
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101-key SpaceSaver kbd.
- High-speed ZEOS I/O with two serial, one parallel & one game port built in.
- 7-16, 1-8 bit expansion slots. Math coprocessor support for '386.
- Rugged ZEOS SpaceSaver case with two cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 watt power supply now with its own built-in surge suppressor.
- Includes ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction package.

**ORDER NOW TOLL FREE
800-423-5891**

FAX Orders:
612-633-1325
Government:
800-245-2449
TDD Orders:
800-228-5389
Outside U.S. and
Canada: 612-633-6131
MasterCard, VISA, Am Exp, Discover,
Z-Card, COD and Leasing programs.
GSA #GS00K91AG55176
Open 24 Hours a Day, 365 Days a Year!



Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications subject to change without notice. Please call to confirm pricing, specification and warranty details. The following are trademarks of their respective corporations: Microsoft, MS-DOS and Windows of Microsoft Corporation, ZEOS, Computers Now!, SpaceSaver, SuperCase and Z-Card of ZEOS International Ltd. ©1992 ZEOS International Ltd., 530 5th Avenue, N.W., St. Paul, MN 55112 USA. ZEOS is a publicly traded company, NASDAQ symbol ZEOS. Lotus is a registered trademark of Lotus Development Corporation. Ami Pro is a trademark of Samna Corporation, a wholly-owned subsidiary of Lotus Development Corporation.

WOPR and MasterWord: Two Add-Ons Fill Gaps In Word for Windows

HANDS ON
by Barry Simon

Successful products spawn active add-on markets, and *Microsoft Word for Windows* is no exception. Alki Software's \$100 *MasterWord* and Pinecliffe International's \$50 shareware program *WOPR* (pronounced "whopper" and short for Winword Office Power pack) fill in the gaps and enhance the functionality of *Word for Windows* 2.0.

Both packages offer a cornucopia of useful little items as well as major components. *WOPR* includes a toolbar editor, a fancy envelope printer, and a booklet printer. *MasterWord*'s main features are a toolbar replacement, enhanced help, a graphical template selector, and a template manager.

A third major collection of macros, *GTools* (\$39.95 from Indelible Inc.) will also soon be available: it provides macros to assign other macros to key combinations not supported by *Word for Windows* and a slick macro to change directories.

WOPR

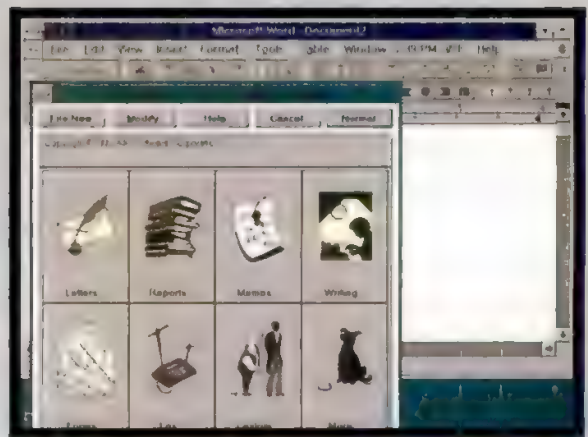
The icon-based toolbar in *Word for Windows* 2.0 is one of its more popular features, but colorful, it isn't: Most icons are black, gray, and white. Using an undocumented backdoor in *Word for Windows*, *WOPR*'s TBEedit program lets you add color to icons and even replace them. You

start with *Word for Windows*' set of icons and then use TBEedit's simple paint program tools—brush, flood fill, and screen capture—to give your toolbar pizzazz.

WOPR's Enveloper 4.0 shows how much *Word for Windows*'s highly regarded envelope printing ability could be improved. You can set up multiple envelope templates for different-size envelopes, different return addresses, and different fonts. *WOPR* also goes beyond *Word for Windows* with postal bar codes (fonts are provided in TrueType and PostScript formats), logos, and messages such as "Air Mail." On a PCL 5 printer such as the HP LaserJet III, you can print envelopes in reverse landscape, which prevents smudges.

The "2 by 4" macro lets you print odd or even pages or print duplex pages—that is, odd and even pages on opposite sides of a page. You can also "squish" pages and turn them sideways to print two pages side by side. You can even squeeze in four pages if you combine squishing and duplex printing.

In addition to these three main components, *WOPR* has over a dozen "little WOPRs." Among the best: one that places the date and time in your menu bar and an enhanced EditFind command that remembers your recent Find requests. Another of the more substantial "little WOPRs" is a macro licensed from the Prime collection (a well done set of



MasterWord has a template selector that's designed to appeal to novice users. The toolbar is *MasterWord*'s; it replaces *Word for Windows*' built-in toolbar.

macros from Plan B Consulting; 818-716-6783, \$29.95) that is a replacement for FileNew and links *PackRat* and *Word for Windows*. With FileNew, you can name up to 12 templates and assign files built on those templates to specific directories.

MASTERWORD

MasterWord has a toolbar for *Word for Windows* commands and an editor to redesign icons. Unlike *WOPR*'s, *MasterWord*'s toolbar is separate from *Word for Windows*' built-in toolbar; it can float vertically or horizontally, or you can lock it in place directly above *Word for Windows*' own toolbar and toggle between the two.

MasterWord ships with over 400 colorful icons, and its toolbar can display the date, time, current template, or word count. You can even set up multiple toolbars and shift between them with a few keystrokes.

A second major component of *MasterWord* is on-line help. Alki Software licensed *Word for Windows*' help system from Microsoft as its starting point but added enough extra material to swell the help files from 1.7MB to a whopping 3MB. The content of the help system is lucid and comprehensive. Its developer, Peter Rinearson, is the founder of Alki and is known for his books on *Microsoft Word*.

MasterWord makes extensive use of the help engine in *Windows* 3.1. A particularly nice touch is a Related Topics button

that displays a help window even after you leave a topic.

A third component is the *MasterWord* Manager, which lets you choose two *Word for Windows* templates and copy or move macros, styles, or glossaries between them. It can be invaluable in juggling macros. *MasterWord* also wears a graphical template selector that's attractive to novice users and provides a Nickname feature that lets you assign abbreviations to styles and macros.

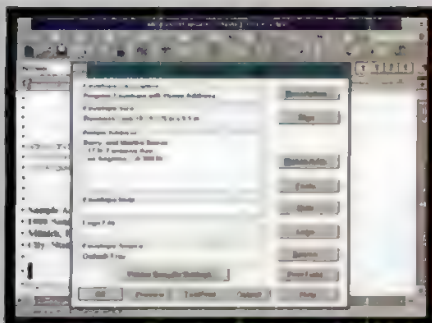
MasterWord also has enhanced File Open and Save, and added a Close All feature and 25 simple macros—including some for printing even or odd pages.

An experienced *Word for Windows* user will feel like a kid in a candy store when using *WOPR* and *MasterWord*. Put these shortcuts and enhancements to work, and they'll quickly become essential tools to working smarter in *Word for Windows*.

List Price: *WOPR*, Version 2.0, \$49.95. **Requires:** *Microsoft Word for Windows* 2.0, *Microsoft Windows* 3.0 or later. Pinecliffe International, 11900 Grant Pl., Des Peres, MO 63131; 800-659-4696; 314-965-5630.

CIRCLE 428 ON READER SERVICE CARD
List Price: *MasterWord*, \$99.95. **Requires:** *Microsoft Word for Windows* 2.0, *Microsoft Windows* 3.0 or later. Alki Software, 219 First Ave. N., #410, Seattle, WA 98109; 800-669-9673; 206-286-2600.

CIRCLE 429 ON READER SERVICE CARD



WOPR's Enveloper macro has many customization options. The colors on *Word for Windows*' toolbar are added with *WOPR*'s toolbar editor.

First Looks

JetFax II Turns Your Laser Printer into a Plain-Paper Fax Machine



If you receive lots of faxes, dealing with the curled and faded paper output from a thermal fax machine can be a real nuisance. The \$995 JetFax II from JetFax is a well-designed add-on that can help you avoid that drudgery. It connects to your HP LaserJet-compatible laser printer and lets you receive high-quality faxes on plain paper. You can also send files stored on your PC as faxes using the accompanying software.

To install the JetFax II, you connect the parallel cable from your PC to the JetFax II instead of a printer and then connect the JetFax II to a laser printer via the supplied cable. Connect the JetFax II to a telephone line and you're ready to receive faxes.

The JetFax II is housed in an attractive beige molded-plastic case that is perfectly designed to sit alongside an HP LaserJet Series II or III printer. If space is tight, you'll find the JetFax II's footprint of 7 by 2 by 18.5 inches quite compact. All you really need is about 2 inches on one side of your LaserJet.

BETTER THAN A FAX BOARD

The unit is CCITT Group 3 fax-compatible and operates at 9,600 bps, with fallback to 7,200-, 4,800-, and 2,400-bps per CCITT guidelines. The JetFax II offers

several advantages over PC fax board products. For one thing, the unit comes with its own power supply and can operate independently of your computer. This means you don't need to keep the PC or the printer turned on in order to receive faxes.

If the printer is turned off, out of paper, or busy, the JetFax II's standard 1MB of internal memory can store up to 60 fax pages. An optional upgrade to 4MB costs \$595. When you power up your system, any pending faxes will be printed. The unit also draws very little power and remains quite cool even after weeks of use.

Since the JetFax II receives and prints faxes without interfering with your CPU, you won't incur any performance penalty in your foreground applications, as you would while receiving faxes using a fax board. A standard nickel cadmium battery keeps the JetFax II's memory intact for up to 8 hours after a power outage.

CONVENIENCE FEATURES

Several convenience features are also included. For example, the JetFax II can print on letter-, legal-, or A4-size paper and can automatically reduce received faxes to print on letter-size paper. Immediate and delayed polled reception is also supported. You can have the JetFax II automatically print up to five copies of incoming faxes. A comprehensive activity report can be printed

that details your current JetFax II parameters and lists the last 24 fax transactions.

To set the JetFax II's parameters, you can use its interactive voice response system. Just

plug a telephone into the JetFax II and enter your choices with the telephone keypad. You can also use the supplied *JetFaxPC* or *JetFaxWindows* software to download the configuration parameters to the JetFax II. You can tell the JetFax II to turn its speaker off and to give the computer printing priority over the JetFax II, for example. Some settings, such as the paper type and the number of copies to print, can also be set via push buttons on the JetFax II itself.

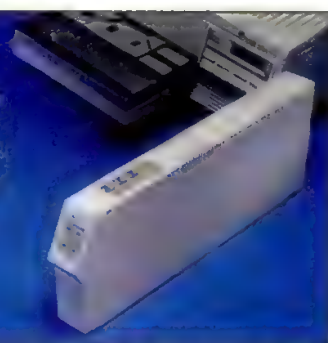
The JetFax II converts incoming faxes to HP PCL format prior to printing. This results in crisp, clear printouts. To print using 300 dots per inch, you must have at least 1MB of memory installed in your printer. Otherwise, you can print at 150 dpi, but you'll notice a slight reduction in quality. If you use an HP LaserJet Series II, IID, or IIP, you can purchase the optional accelerator cartridge (\$155) to speed up printing of graphics images. This isn't necessary on newer models like the HP LaserJet Series III.

SEND FAXES, TOO

To send faxes you can attach an external fax machine to the JetFax II's auxiliary fax RJ-11C connector, so both units can share the same phone line. Or you can send documents stored on your PC using the supplied DOS and Windows software. *JetFaxPC*, the DOS software, can be installed in memory-resident mode or as a standard application. As an 8K TSR, it can capture output sent to the printer from another application and convert it to a fax transmission. It can also convert and transmit black-and-white .PCX, uncompressed TIFF, HP PCL4, HP PCL5, and ASCII files.

The *JetFaxWindows* software lets you send faxes by printing to

The \$995 JetFax II takes up little space as it funnels faxes to your laser printer for plain-paper printout.

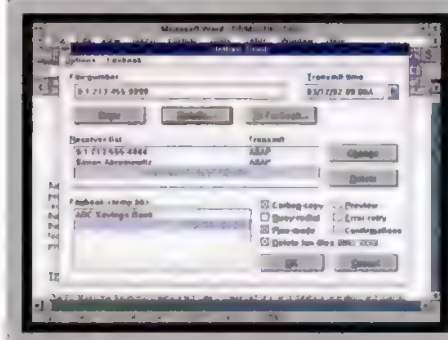


the JetFax II print device from your Windows applications. The software requires that you load a 34K TSR prior to running Windows and lacks some features found in the DOS software, such as the option to test-print a fax before sending it and the ability to create a cover page. JetFax is working on fixing some anomalies in the installation program that caused the software to produce some substandard results.

FAX OVER THE NETWORK

For network faxing, you can connect the JetFax II to a file or print server the same way you hook it up to a standalone PC. When a user on the network sends a fax, it will appear to the network software as a print file, but the JetFax II will intercept it and send it as a fax. Incoming faxes are printed as soon as the printer becomes available.

The JetFax II isn't cheap, but it does a great job of putting faxes on plain paper and eliminating some of the headaches associated with fax boards.



The JetFax/Windows software lets you send a fax by printing to the JetFax II print driver just as you would to your laser printer.



FACT FILE

JetFax II

JetFax Inc., 978 Hamilton Ct., Menlo Park, CA 94025; 800-753-8329, 415-324-0600.

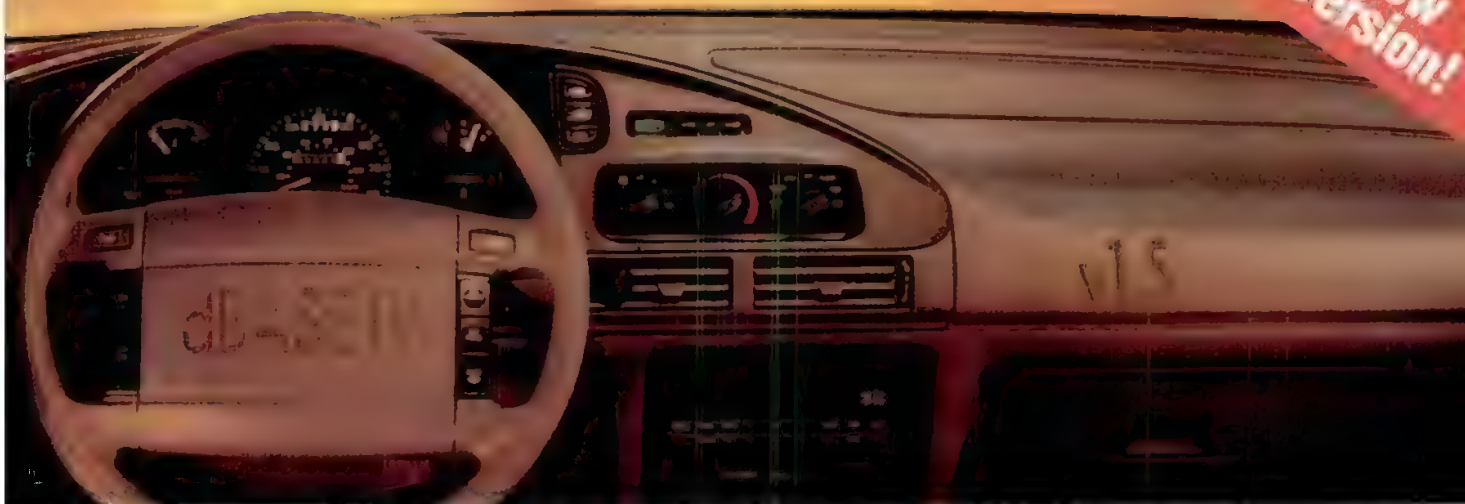
List Price: \$995.

Requires: HP DeskJet, HP LaserJet, or compatible printer. DOS requirements: 512K RAM, 1.5MB hard disk space, DOS 2.0 or later. Windows requirements: 512K RAM, 1MB hard disk space. Adobe Type Manager recommended.

In Short: The JetFax II is an attractive extension to your HP LaserJet-compatible printer that lets you receive plain-paper faxes and send faxes using the supplied software.

CIRCLE 419 ON READER SERVICE CARD

New
version!



"Have you driven dBASE lately?"



The new 1.5 model of dBASE IV is here

And it's loaded with more standard features. Like mouse support for easy maneuvering through applications.

Multi-file view editing for direct updating. Query By Example (QBE) summary operators and pick lists for increased operations. And automatic installation of complex programs and configurations. So whether you're a first-time buyer or a dBASE expert, you can quickly get the best out of dBASE IV v1.5.



Increased performance for faster results

Shift into the information you need sooner with the dBASE IV v1.5 new optimization technology—IQ!™. Now dBASE has three different ways of retrieving data and will automatically choose the fastest one for you.

Superior programmability for complex applications

Now up to 40 open work areas are possible at any one time, offering greater flexibility for more complex applications. Enhanced BLANK support gives you the power to detect empty fields for data validation and statistical operations. Plus, the widely respected dBASE Template Language is now standard in dBASE IV v1.5.

A great product begins with the basics

Behind the new features of dBASE IV v1.5 lies the flexibility of a worldwide standard. No other database software is available on more platforms than dBASE. Add that to the dBASE Control Center with its road-tested design tools and the dBASE Programming Language, featuring integrated IBM's SAA-complaint SQL, integrated debugger, and built-in applications generator, and you have the most well-rounded database management and application development product in the world.



part of the Borland family, you can expect Borland's world-renowned service and support. Now is the time to join the more than three million people who already drive dBASE.



Technology you can build upon

There are no stop signs ahead for dBASE IV v1.5 thanks to its Open Architecture Control Center, allowing you to add third-party designers to your crew—and access additional tools—at any time.

Borland: the new force behind dBASE

dBASE IV v1.5 marks a return of innovation and pride to the dBASE community. And now that dBASE IV v1.5 is

Get dBASE IV v1.5 now!

If you're a current dBASE user, you can upgrade to dBASE IV v1.5 for \$99.95. Call and order now. If you're not completely satisfied, Borland will refund your money within 60 days of purchase. No questions asked.

See your dealer today or call now:
1-800-331-0877, Dept. 6364



B O R L A N D

dBASE IV from Ashton-Tate,® a Borland Company

Ashton-Tate, dBASE and dBASE IV are registered trademarks of Borland International, Inc. Copyright © 1992 Borland International, Inc. All rights reserved. Pricing is in U.S. dollars. Offer good in U.S. and Canada only. Dealer prices may vary. B1 1488

CIRCLE 295 ON READER SERVICE CARD

First Looks

Two Enhancement Shells Build a Better Windows



The improvements introduced in Windows 3.1 have raised the ante in the Windows utility market. Enhancement shells like *AttiTools* and *BeckerTools* now have to do even more for the money. Fortunately, they continue to provide features that make Windows easier and more productive.

ATTITOOLS

Attitash Software's \$99.95 *AttiTools* enters the competitive Windows shell market with four programs licensed from Access Softek, including upgrades to *Dragnet* and *Prompt* (renamed *Catalyst*), which used to have a combined price of \$270. Added to *Dragnet*'s text search and *Catalyst*'s file management are the program launcher *Slingshot* and *DiskSpace*, which provides a graphical display of disk usage by file type.

A slick adjunct to Windows' Program Manager, *Slingshot* displays Program Manager groups in a horizontal button bar that is small enough to appear on the desktop at all times. You'll still need the Program Manager to add items to groups.

Catalyst is a File Manager replacement with the standard display of a file tree on the left and directory list on the right. You can open multiple trees and multiple directories in a given tree. Since there is not full support for Windows' multiple document interface (MDI), you

cannot minimize a directory window. You can drag files or whole directories from one place to another, even between drives.

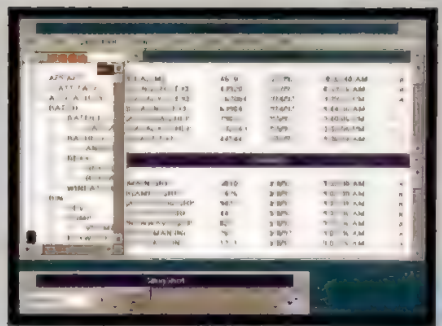
Catalyst comes with viewers for a considerable set of file formats, but there are gaps. There is no support for major Windows word processors; the .PCX and TIFF viewers do not support 24-bit color; the palette support for .GIF files is poor; there is no hexadecimal viewer; and several of the viewers don't properly redraw the screen when you maximize a window.

The program's proprietary file compression scheme is not competitive with the best stand-alone compression programs. On our test of nine files totaling 450K, *LHA* compressed the files to 51 percent of their size; *Catalyst* compressed the files to 76 percent of the original size.

Dragnet gives you more control over searching for text in files than any other Windows file manager. It allows Boolean searches and will display on-screen the text surrounding your "hits." You can also send text to the Clipboard or to a file. You can use DDE (dynamic data exchange) links to copy the names of files with hits to *Catalyst*, where you can manipulate them.

Dragnet is no speed demon. Our informal tests searched for a string in a 15MB directory with over 300 files. On a 386/25 with the disk cache disabled, *Dragnet* took 14 minutes. In comparison, Lotus's *Magellan* took 7.5 minutes, and *The Norton Utilities*'

AttiTools' four components include *Catalyst*, a file manager to replace Windows' own, and *Slingshot*, a push-button program launcher.



SuperFind took just under 5 minutes. When we used *Magellan*'s index, the search took *Magellan* only 10 seconds. *Dragnet* does not have indexing.

AttiTools stands out for the elegance of *Slingshot* and the flexibility of *Dragnet*. It's a serious competitor in the Windows' shell game.

BECKERTOOLS

If you're in the market for a disk manager, Abacus's \$129.95 *BeckerTools 3* should grab your attention. It does not have the icon editor and batch builder of *The Norton Desktop for Windows*, but it includes some disk utilities, such as the disk and hex-file editors, that *NDW* included only in its DOS version.

BeckerTools has 13 separate executables and an interface that supplements standard menus with toolboxes and button bars. At its center is the Becker Shell, a replacement for the File Manager. As in the File Manager, you can copy or move files by dragging them from one panel to another. But the Becker Shell goes beyond the File Manager in several ways. There is an icon toolbox that you can edit to include the ten menu options you want available at a single click. And there is a set of linked file viewers for text, hex, and seven graphics formats, including Lotus .PIC and common bitmapped formats. There is also a file/text find feature.

BeckerTools' other components include hex and text editors, an .INI file editor, a program to print in ASCII or hex format, an undelete function, a disk recovery program that repairs damaged file attribution tables (FATs), a disk defragmenter, and a backup program. Abacus plans to bundle *Disk Doubler*, an

on-the-fly disk compression program of the genre made popular by *Stacker*.

While *BeckerTools* has a broad sweep and clean interface, it also suffers from poor design, limitations, and minor bugs. The file viewer causes UAEs (unrecoverable application errors) when you try to load 24-bit .PCX or TIFF files, and *Adobe Type Manager* fonts appeared in the print program in only 72 point size. Abacus expects to fix both bugs in a maintenance release.

The Disk Editor only displays in hex format without the special directory or FAT modes that *The Norton Utilities* has had for years. The viewers support a limited number of file types and do not include spreadsheet (.WKS and .XLS), database (.DBF), and word processor (.DOC) files.

The backup program does not compress files before backing up and will not let you set up automated backup of only certain directories. Also, there is no way to view sectors during an undelete operation.

If *Disk Doubler*, the sector editor, or the hex editor is appealing, you should give *BeckerTools* a careful look. But many of the same features are also found in *The Norton Desktop for Windows*, a better designed and more flexible package. ■

List Price: *AttiTools*, Version 1.0, \$99.95. Attitash Software, 20 Trafalgar Sq., Nashua, NH 03063; 800-736-4198, 603-882-4809. **Requires:** Microsoft Windows 3.0 or later.

CIRCLE 417 ON READER SERVICE CARD

List Price: *BeckerTools 3*, \$129.95. Abacus, 5370 52nd St. SE, Grand Rapids, MI 49512; 800-451-4319, 616-698-0330. **Requires:** Microsoft Windows 3.0 or later.

CIRCLE 418 ON READER SERVICE CARD



The central component of *BeckerTools* is a File Manager-like shell that you can configure to contain the menu choices you use most.

Sum

Font

Style

Best for
Novell Networks

Introducing Quattro Pro 4.0

The only DOS spreadsheet with pushbutton power!



**Borland does it again—
Sorry, Lotus!**

No other DOS spreadsheet gets your work done faster than Borland's new



Quattro Pro's customizable, built-in SpeedBar™ is a row of clearly labeled buttons that use simple English commands to give you instant mouse-click access to your frequently used features and macros.

Plus you get immediate access to a host of new features.



spreadsheet in the world. Features such as WYSIWYG, Print-To-Fit™ spreadsheet output, superb 1-2-3® compatibility (you can even read Allways, Impress and WYSIWYG files) and more.

**Top-rated spreadsheet
Top-rated company**

Quattro Pro has won more awards for technical excellence and customer satisfaction than any other DOS spreadsheet. In fact, in the prestigious J.D. Power and Associates® survey, Borland was ranked #1 (tied) for Application Software Publisher in Customer Satisfaction Among Business Users.*

Now you know why more than one million people have upgraded to the power of today's spreadsheet. Quattro Pro.



Quattro® Pro 4.0 with pushbutton power!

Quattro Pro beats 1-2-3 . . . again!

New	Quattro Pro 4.0	Lotus 1-2-3	
		R 2.3	R 3.1+
Most Powerful	Yes		
Intelligent Graphs	Yes	No	No
Novell Network optimized	Yes	No	No
Multiple sheets	Yes	No	Yes
Multi-variable solver	Yes	No	*
Easiest to Use	Yes		
SpeedBar	Yes	No	No
Print-To-Fit	Yes	*	*
Read Lotus 1-2-3 files, styles & macros	Yes	Yes	Yes
Best Performance	Yes		
All features in 640K	Yes	?	No
Price	\$495	\$495	\$595

? Yes, but almost no room remains for data.

*Yes, but requires attaching an add-in

Intelligent Graphs let you perform extended analysis with your graphs without changing your data. And Quattro Pro's Optimizer™ allows you to solve complex problems using multiple variables.

**The best spreadsheet
on networks**

Only Quattro Pro 4.0 gives you superior Novell NetWare support, including automatic logon, drive mapping and a new Print Queue Manager.

**The most feature-packed
DOS spreadsheet ever!**

And in addition to Quattro Pro 4.0's dramatic new advances, you get the features that have made it the #1-rated

Attention 1-2-3 users!

Step up now!

Special Upgrade offer

**See your dealer today
or call now,**

1-800-331-0877, Dept. 5635

B O R L A N D
Software Craftmanship

* J.D. Power and Associates 1991 Computer End User Satisfaction Study: Phase IV: Business End User Summary. Responses from 4,396 business sites. Copyright © 1992 Borland International, Inc. All rights reserved. All Borland products are trademarks of Borland International, Inc. Pricing is in U.S. dollars. Offer good in U.S. and Canada only. Dealer prices may vary. BI 1471B

CIRCLE 267 ON READER SERVICE CARD

First Looks

High-Priced, High-End Omnis 7 Brings DBMS Development to Windows



After a decade in the database application arena, Blyth Software has taken a big step forward with the release of *Omnis 7* for Windows. The *Omnis 7* integrated development environment gives Windows developers all the tools necessary to craft sophisticated database management systems.

Omnis 7, an update of *Omnis 5*, is impressive, with more speed and new features. Notable additions include a powerful application debugger that enables developers to step through procedures, examine the procedure stack, check and modify field values during execution, and set static or dynamic break points.

Other new features include an end-user ad hoc reporting facility, parameter passing between procedures, and the ability to place pop-up menus on windows.

The overall structure for developing applications is unchanged. *Omnis 7* flows seamlessly from coding to execution to debugging and offers a series of pick lists and menus to help you build your application.

Omnis 7 is also available in single- and multiuser versions for Windows and for the Macintosh. Binary and data files are compatible across both platforms. By bundling Accuware's *Accu-Fonts* Mac-compatible screen fonts for Windows, Blyth Software has taken steps to ensure that screens developed on the one platform



Omnis 7+, the extended version of the *Omnis 7* DBMS for Windows, comes with *SQL Express*, a front-end database manager.

look the same when run under the other program.

An extended version, *Omnis 7+*, supports add-on extensions written in C, a graphing module, and connectivity modules. The connectivity modules enable *Omnis 7* to serve as a front end to SQL database engines from Sybase, Microsoft, IBM, INGRES, Oracle, and Digital.

Blyth Software has corrected some of the early problems encountered by developers and is now shipping a maintenance release, Version 1.03. At \$1,250 for a single-user, standalone development kit, this package is

clearly targeted at developers. The high price and relative immaturity of *Omnis 7*, Version 1.0, are the biggest drawbacks to widespread acceptance of this ambitious DBMS development environment.

List Price: *Omnis 7*, Version 1.0, \$1,250; upgrade, \$325; *Omnis 7+*, \$2,500; upgrade, \$650. **Requires:** 2MB RAM, 5MB hard disk space, Microsoft Windows 3.0 or later. Blyth Software Inc., 1065 E. Hillsdale Blvd. #300, Foster City, CA 94404; 800-346-6647; 415-312-7146.

CIRCLE 423 ON READER SERVICE CARD

Lotus Write: The \$199 Windows Word Processor With Full Feature Set



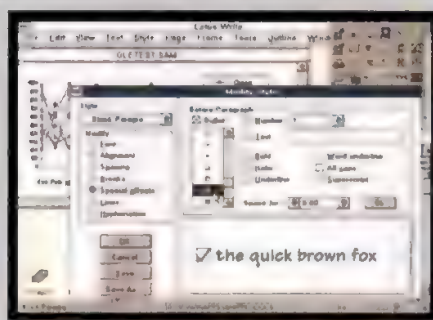
Lotus Write 2.0 is the first low-priced Windows word processor designed to make you want to use it. Lotus Development Corp.'s \$199 package offers a surprisingly rich subset of features from Lotus's full-priced *Ami Pro*, and takes up half the disk space. It doesn't let you create graphics, charts, or tables, but if you use a word processor primarily to process words, it probably has all the features you need.

Lotus Write looks and acts almost exactly like *Ami Pro*, but with slightly shorter menus. Both programs let you open nine files at once, and both include Lotus's customizable SmartIcon palette, which can float anywhere on-screen, even outside the program window. Both programs have built-in links to *cc:Mail* and *Lotus Notes*. Both use the same spell-checker, thesaurus,

and import and export filters; both share the same easily managed collapsible outlines and stylesheets complete with bulleted lists and boxed text. They also use the same advanced macro language—the most flexible such language in any word processor.

You can import, resize, and rotate graphics in *Lotus Write*, but you can't create or edit them as you can in *Ami Pro*. You can't create tables in *Lotus Write*, but you can use Windows' DDE (dynamic data exchange) to import data from a spreadsheet that changes when the spreadsheet changes; or you can use OLE (object linking and embedding) to import an *Excel* graph.

If you need advanced features such as master documents (which contain multiple files) or automated tables of contents, indexes, and cross-references, you need *Ami Pro*, not *Lotus Write*. You have to search to find other *Ami Pro* features that are miss-



Lotus Write, *Ami Pro*'s smaller sibling, lets you customize the SmartIcon palette and pop menus up from the status line at the bottom of the screen.

ing from *Lotus Write*. One of them is *Ami Pro*'s "floating header," which starts on the same page with specified text and stays with that text even if the text moves to another page. If you don't use that kind of formatting, you'll probably never miss the features you don't get.

Lotus Write's performance closely matches *Ami Pro*'s—slow to load, fast in almost everything else. You don't get *Ami Pro*'s background print formatter, but printing speed is on a par with full-featured programs. The program fills 5MB, enough to make a significant dent in a laptop hard disk. You can import *Ami Pro* files into *Lotus Write*—

both programs use the same file extension—but a pop-up message warns you that any tables in the imported file will be lost.

Rival low-end Windows programs like Software Publishing's *Professional Write Plus* and Symantec's *JustWrite* can't match *Lotus Write*. If you want an inexpensive Windows word processor, this is the one to choose.

List Price: *Lotus Write*, Version 2.0, \$199. Lotus Development Corp., 1000 Abernathy Rd., Bldg. 400, #1700, Atlanta, GA 30328; 800-831-9679; 404-391-0011. **Requires:** 2MB RAM, 4.8MB hard disk space, Microsoft Windows 3.0 or later.

CIRCLE 422 ON READER SERVICE CARD

Borland
Sets the Standard

Unleash the power of the C with Borland C++

Professional C programmers are choosing object-oriented C++ because they know it increases productivity. And the C++ they're choosing is from Borland. Borland® C++ & Application Frameworks gives you amazing code reusability, extensibility and easier maintenance. With more than 650,000 copies of Borland's C++ products in use, Borland C++ sets the standard.

C and C++ for DOS and Windows

Borland C++ & Application Frameworks is the #1 choice of professional C and C++ programmers for Windows and DOS application development. The third-generation C++ compiler fully supports the AT&T Cfront 3.0 standard C++, including templates! The powerful C compiler fully implements the ANSI C standard. And the Application Frameworks dramatically reduce your development time with sleek user interfaces and high-level objects that bolt right on to your application with just a few lines of code.

INFO
WORLD
PRODUCT
OF THE
YEAR

1 9 9 1

The C++ you can rely on!

Borland C++ & Application Frameworks includes:

- ObjectWindows™ for Windows
- Turbo Vision™ for DOS
- Complete source code for both Application Frameworks and the runtime library
- Borland C++ 3.0

Borland C++ 3.0 includes:

- Full C++ with templates
- ANSI C
- Global optimizer

- Precompiled headers
- Windows Development Environment
- DPAPI support
- ObjectBrowser™ visually displays classes
- EasyWin™ converts DOS apps to Windows
- Resource Workshop to create Windows dialogs, menus, bitmaps, icons and more
- WinSight™ message tracking utility
- Turbo Debugger® for DOS and Windows
- Turbo Profiler™ for DOS and Windows
- Object-Oriented Turbo Assembler®

Borland makes your transition from C to C++ easy!

Borland has created two video training packages, complete with workbook and sample source code that you can plug right in to your program. And now with your order, you can get one **FREE** (retail value \$99.95). If you buy Borland C++ (\$495 suggested retail price*), you'll receive the *World of C++* video training package **absolutely free**. If you buy Borland C++ & Application Frameworks (\$749 suggested retail price*), you'll get *World of ObjectWindows for C++* **FREE**.

**See your dealer today or call now,
1-800-331-0877, ext. 5338**

ACT NOW! Offer ends May 31



BORLAND

The Leader in Object-Oriented Programming

*All prices are in U.S. dollars. Dealer prices may vary. Offer good in U.S. and Canada only. Copyright © 1992 Borland International, Inc. All rights reserved. All Borland products are trademarks of Borland International, Inc. BI 1480

CIRCLE 285 ON READER SERVICE CARD

Number Nine's #9GXi Lite Graphics Adapter Opens Wider Windows

HANDS ON
by Ben Hayes

The #9GXi Lite from Number Nine Computer Corp., a venerable supplier of graphics adapters based on Texas Instruments TI340x0 chips, lowers the price for high-resolution Windows graphics to \$995 while retaining many of the bells and whistles of its higher-priced, high-power sibling, the \$2,495 #9GXi. The Lite adapter is available in two models—the Level 20 and Level 21. To take advantage of its best options, you'll need the \$1,295 Level 21, which adds Windows' virtual screen capability; an AutoCAD display list driver; and 1MB of DRAM memory. A \$520 upgrade kit for the Model 20 is also available.

In either the Level 20 or 21 configuration, the #9GXi is a single-board solution: Its built-in VGA chip responds to system startup and DOS command-line operation, and the TI34020 chip handles all graphics operations.

VIRTUAL SCREEN

Number Nine's HawkEye utility allows you to configure a virtual screen that is larger than the actual image displayed on your monitor. In other words,

the "real" monitor screen provides a window into the larger "virtual" screen. For example, if you have a 2,048-by-1,024 virtual screen and a monitor with an 800-by-600 resolution, you can only see one 800-by-600 area at one time. HawkEye lets you pan around very quickly to view any 800-by-600 portion of the total virtual screen. The available choices are 1,024-by-2,048 resolution for a tall virtual screen or 2,048-by-1,024 for a wide one.

The #9GXi Lite adapter board retains the complete virtual screen image in its memory. You can pan around within the virtual screen by pushing the cursor against the edge of the actual screen in the direction you want to go. Both panning and zooming are instantaneous because the #9GXi Lite requires no help from the PC to display the information.

Once the virtual screen is set up, you can also zoom in on a smaller area of the screen by using the F11 key. The zoom operation magnifies up to eight times normal size and reduces the total area viewed to one-eighth normal size. HawkEye's F12 hotkey toggles back and forth between enlarged and normal screen sizes. You can select another function key if HawkEye's de-

fault keys conflict with other Windows software.

The ability to pan across a virtual screen is handy when working with extra long or wide spreadsheets and documents. A virtual screen is a more responsive alternative to the standard Alt-Esc key combination for switching among several full-screen Windows applications running at the same time. Zooming in on an area of the screen can magnify an area when you need to do fine work with a Windows drawing package, or you can use it simply to relieve eyestrain.

PLUG-AND-PLAY

Number Nine has covered the bases to ensure that the #9GXi Lite plugs-and-plays in a majority of existing hardware setups. DIP switches and a setup utility facilitate a wide variety of settings for the hardware port, the interrupt request queue (IRQ) number, the high-memory address for a TIGA buffer, and 8- or 16-bit operation of the VGA BIOS.

The setup utility lets you choose a 60-Hz or 72-Hz monitor refresh rate and interlaced or non-interlaced operation at standard resolutions from 512-by-480 through 1,280-by-1,024 to match the signal requirements of a wide range of monitors. High resolution graphics will cause you much less eyestrain when both your monitor and graphics adapter operate at a 72-Hz vertical refresh rate in a noninterlaced mode. Number Nine provides cables for hi-res monitors that use RGB connectors, plus a VGA pass-through cable and a VGA signal terminator for using the #9GXi Lite with another graphics adapter. Either a jumper switch or a setup utility option can disable the VGA BIOS for use with another VGA adapter.

Another feature of the setup utility is a menu that lets you center the graphics image displayed on your monitor screen using the arrow keys. Like many other graphics adapters that use either the Texas Instruments TI34010 or TI34020 graphics chip, the setup program lets you select the Windows display resolution without running the Windows setup program. When



FACT FILE

#9GXi Lite

Number Nine Computer Corp., 18 Hartwell Ave., Lexington, MA 02173; 800-438-6463, 617-674-0009.

List Price: Level 20 model with 1MB of VRAM (Windows only), \$995; Level 21 model with 1MB of VRAM, 1MB of DRAM, AutoCAD display list driver, and Windows virtual screen, \$1,295; upgrade kit (Level 20 to Level 21), \$520.

In Short: The #9GXi Lite graphics cards are TI34020-based solutions for high-resolution Windows and AutoCAD use. The Level 20 is a Windows-only model, while the Level 21 model adds memory, an AutoCAD display list driver, and virtual screen operation under Windows. Both models contain all of the necessary connectors for use with other graphics cards and with RGB monitors. The Level 21's virtual screen is a distinctive feature.

CIRCLE 434 ON READER SERVICE CARD.

Windows starts up, the TIGA TSR tells Windows which resolution it is using.

The TIGA TSR, which must be installed to operate the TI34020 graphics, takes up 41K of RAM. It must use a software interrupt that is selectable to eliminate a conflict with other software, and can be uninstalled as required.

Number Nine's Windows installation program adds a Windows program group for the HawkEye virtual screen utility and a program that enables or disables HawkEye. The installation guide accompanying the #9GXi Lite is clearly written and well designed, with diagrams that guide the novice through the hardware installation.

FASTER WINDOWS

The #9GXi Lite turned in a very respectable graphics WINMARK score when installed in a 33-MHz 486 system, performing at more than twice the speed of a 25-MHz Compaq 386 VGA system. Though not absolutely the fastest Windows graphics card on the market, the #9GXi Lite offers an extensive set of distinctive features and options. If you use Windows heavily, you may get hooked on the #9GXi Lite's wide-open virtual screen capabilities. ■



With the #9GXi Lite, you can configure a virtual screen at 2,048-by-1,024 resolution that's larger than the image displayed. Instead of using Alt-Esc to switch among Windows applications, you can pan across the screen.

Never Underestimate The Importance of Complete Protection.

What good is last night's backup if you just lost everything you worked on all morning?

And even if you have a data recovery product, it won't help when

you write over a file and then discover you want it back.

And virus protection software is great. If all you have is a virus.

There are dozens of ways

to lose data. If you bought a different product to solve every conceivable problem it would cost a fortune. You need PC Tools™.

Only PC Tools gives you complete data protection in one integrated package. All 28 utilities

in PC Tools were designed to work together to make using your PC safer, simpler and faster.

With our award-winning Backup you can back up data automatically to just about any device, including all the most popular tape drives. In DOS or Windows.

Need to repair a hard disk? Undelete or repair files? Locate missing data? With PC Tools it's no problem.

And our Virus Protection can detect over 800 viruses on both

local and network drives.

Before they can cause any damage.

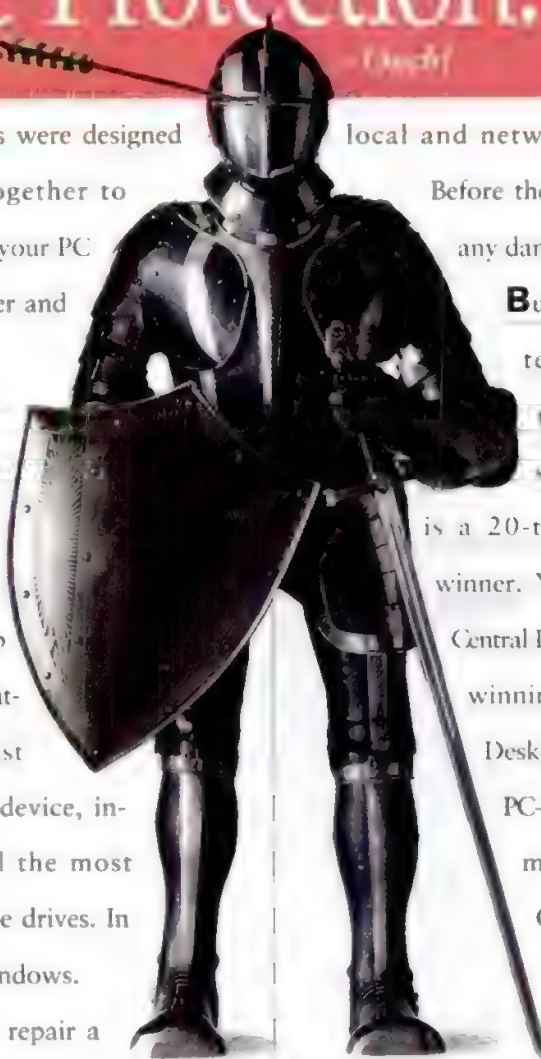
But data protection isn't the only reason PC Tools

is a 20-time award winner. You also get

Central Point's award-winning PC-Shell™, Desktop Manager, PC-Cache™, Commute™ Remote Computing, and dozens of other

indispensable utilities.

Call us for the complete story on PC Tools. It makes everything else as outdated as a suit of armor.



F.A.S.T.F.A.C.T.S

COMPLETE DATA PROTECTION

Backup for Windows & DOS
Disk & File Repair
Undelete with Delete Sentry™
Unformat

Disk Optimizer & File Locate
Virus Protection
Data Encryption & Security

PLUS

Full Windows Compatibility
DOS Shell & File Manager
Disk Cache
Remote Computing
System & Network Info
Desktop Manager



Jan. 1992 Oct. 1991 Feb. 1991

**CENTRAL POINT
PC TOOLS**

Essential Utilities for the PC Professional

Free Disk Backup
Free Disk Repair
Free Disk Defragmentation and Repair
Free Disk and File Manager
Free File Recovery
Free Disk and File Backup
Free Disk and File Encryption
Free Disk and File Compression
Free Disk and File Defragmentation
Free Disk and File Optimization
Free Disk and File Maintenance
Free Disk and File Support



1-800-445-4197

Central Point Software, Inc.

PC Tools is a trademark of Central Point Software.

© 1992 Central Point Software. PC Tools, PC Shell, PC Cache, Commute and Delete Sentry.

Watch where you're going!

SureTrak 2.0 gives you more ways to manage your projects in progress.

Creating schedules is one thing—and SureTrak does it with ease.

But managing a project to a successful finish is what separates the pros from the wannabes.

That's where SureTrak leaves the others behind.

Use it to produce exceptional time-scaled logic diagrams, bar charts, resource profiles and cumulative curves. SureTrak does it all automatically—and lets you customize with symbols, logos or text.

SureTrak graphics and reports help you see how a project is going, pinpoint trouble spots, and develop alternatives to get you back on track.

You can even manage cash flow with SureTrak's exclusive ability to handle revenues, costs and profits.

It's a lot of project management software for just \$795. But then, what else would you expect from Primavera? Call 1-800-872-5457 today.



SURETRAK™
PROJECT SCHEDULER


PRIMAVERA
*How the world says
project management*

SureTrak Division
1574 West 1700 South
Salt Lake City, Utah 84104
(801) 973-9610

by
Emerson
Andrew Torgan

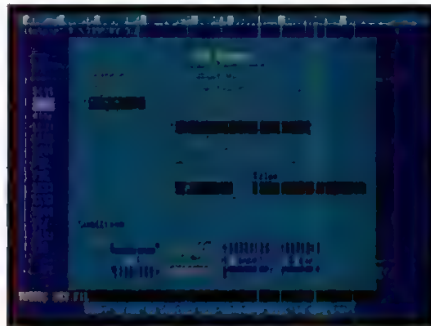
New & Improved

News of Announced Products and Upgrades

WordTech Ships Its Long-Awaited ARAGO Database Family

NEW After two years of development that resulted in a new architecture and source code, WordTech Systems has unveiled its new database management software family. ARAGO consists of ARAGO dBLX, a dBASE IV-compatible interactive environment; ARAGO Quicksilver, a dBASE IV-compatible .EXE compiler; and ARAGO Professional, an integrated development environment that includes both ARAGO dBLX and ARAGO Quicksilver. dBLX and Quicksilver share the same source code for complete compatibility.

ARAGO supports dBASE IV files, indexes, and syntax, has dBASE III command superset and memo field compatibility, and has more than 300 new commands and performance features, according to the company. Enhancements include a CUA-compliant interface; a Panel Painter feature that lets users build event-driven, object-action applications constructed with CUA-compliant windows; an internal compiler that calls external C or As-



ARAGO dBLX provides extensive search facilities and promises to be significantly faster than dBASE IV.

sembly language routines; integrated business graphics; and memo fields that can store any data types, including .PCX graphics files and digitized voice files. It also features a Test Coverage Analyzer that reports which logical blocks of a program have or have not been executed.

ARAGO dBLX and ARAGO Quicksilver are new products but are designated Version 2.0 to avoid confusion with WordTech's original dBLX and Quicksilver.

List Price: ARAGO dBLX, Version 2.0, \$699; ARAGO Quicksilver, Version 2.0, \$799; ARAGO Professional, \$1,199. WordTech Systems Inc., 21 Altarinda Rd., Orinda, CA 94563; 510-254-0900.

CIRCLE 402 ON READER SERVICE CARD

NEC's ProSpeed Is Easy on the Eyes

NEW NEC has unveiled the ProSpeed 486SX laptop featuring a 10.4-inch active-matrix LCD panel with 800-by-600 resolution and 16 shades of gray. A monochrome version of NEC's color ProSpeed 486SX/C, this 16.7-pound unit's high resolution lets users see 33 percent more information on-screen than ordinary laptops, according to the company.

The ProSpeed is powered by a 486SX/20 processor, is available with either a 120MB or 240MB hard disk with DOS 5.0 and Windows 3.0 preinstalled, and provides a built-in 32-bit EISA expansion slot. The laptop ships standard with 2MB RAM (expandable to 20MB using SIMMs), 8K of cache memory, and a 1.44MB floppy disk drive.

List Price: ProSpeed 486SX with 120MB hard disk, \$6,999; with 240MB hard disk, \$7,499. NEC Technologies Inc., 1414 Massachusetts Ave., Boxborough, MA 01719; 800-632-4636, 508-264-8000.

CIRCLE 403 ON READER SERVICE CARD

Network H.Q. Expands Network Compatibility

IMPROVED MAGEE Enterprises' network inventory utility, *Network H.Q.*, Version 2.0, now supports Microsoft's *LAN Manager*, Banyan's *VINES*, and Hayes's *Lan/Step*, in addition to *NetWare*. It also has optional DOS and Windows interfaces.

Network H.Q. tracks all hardware components and now provides more detailed identification of PC model numbers, CPU clock speed, and chip set information. It can also detect BIOS manufacturer and version, NetBIOS version, and bus type. The package lets network administrators collect important workstation files, such as CONFIG.SYS and WIN.INI, for updates and maintenance, and surveys all installed software on both server and workstation drives. The improved reporting utility exports data to .WK* and .DBF file formats.

CONTINUES ON PAGE 60

HOT PROSPECT

GRiD UNVEILS THE PALMPAD: PEN COMPUTING IN THE PALM OF YOUR HAND

It doesn't have a Dick Tracy-style radio, but GRiD Systems' PalmPAD is a pen computer designed to be worn on the wrist or strapped to the hand.

The 2.8-pound unit features a 9.5-MHz NEC V20 processor, 2MB RAM, and DOS 5.0. A slot accommodates PCMCIA RAM cards or a SunDisk flash memory card, providing up to 10MB of solid-state storage. The 6.5-inch LCD panel has 640-by-400 resolution with adjustable fluorescent backlighting and Logitech's Gazelle Graphics overlay scheme. The PalmPAD runs GRiD's DOS-based *PenRight!* software for data collection applications. GRiD offers a choice of a nickel hydride or a nickel cadmium battery, promising up to 8 hours of battery life.

The unit's hand grip contains two pods, one for the batteries and one for a 2,400-bps V.42 data/fax modem or wireless communications module. Alternatively, the batteries can be worn on a belt, reducing the unit's weight to 2.2 pounds. The GRiD PalmPAD is expected to be priced around \$2,000.

List Price: GRiD PalmPAD, not available at press time. GRiD Systems Corp., 47211 Lakeview Blvd., Fremont, CA 94537; 800-222-4743; 510-656-4700.



GRiD's PalmPAD is being offered as the first "wearable" PC, and is designed for data collection applications.

CIRCLE 401 ON READER SERVICE CARD

New & Improved

BRIEFS



DISPLAYS

InFocus has unveiled the 7600XGA (\$7,995), a color LCD projection panel with a maximum resolution of 1,024-by-768 pixels and 24,389 colors. The unit features on-screen setup menus, and images can be displayed on a monitor and the projection panel simultaneously. 800-327-7231, 503 692-4968.

MicroTouch's 14-inch TruePoint Touch Monitor (\$1,399) is a plug-and-play VGA touch-screen display. The unit ships with mouse emulation software drivers for DOS and Windows, and OS/2 drivers supporting the MPC multimedia standard and IBM's OS/2 Ultimedia standard are included. 508-694-9900.

NoRad is shipping ELF ProTech, an external shield for blocking ELF (extremely low frequency) magnetic fields. Prices range from \$49 to \$99, depending on the number of panels necessary to enclose the monitor housing. 800-262-3260.

ViewSonic has unveiled the 17-inch ViewSonic 7E Super VGA color monitor (\$1,199) featuring a flat-square screen. The unit has a 0.31-mm dot pitch and supports a maximum resolution of 1,024-by-768 pixels, noninterlaced. 800-888-8583, 310-946-0711.



MASS STORAGE

Disk Technologies Corp.'s DiscTec RHD 120 (\$1,295) removable hard disk puts 120MB of storage in a .81- by 3.2- by 5-inch unit weighing in at under 7 ounces. The RHD 120's docking bracket is designed to fit any 5.25-inch or 3.5-inch drive bay. The company is also shipping the RoadRunner II series of external hard disks in configurations ranging from 20MB (\$750) to 120MB (\$1,450). 800-553-0337, 407-671-5500.

Micro Solutions is shipping its backpack external hard disk, available in 40MB (\$625) and 100MB (\$795) configurations. The unit attaches to any PC via the parallel port. 815-756-3411.

Newer Technology's new SCSI-II Dart RAM Drive promises to provide up to a 12MB-per-second sustained data-

CONTINUES ON PAGE 64

CONTINUED FROM PAGE 59

List Price: *Network H.Q.*, Version 2.0, \$395 per server. **MAGEE Enterprises Inc.**, 2909 Langford Rd., Suite A600, Norcross, GA 30071; 800-662-4330, 404-446-6611.

CIRCLE 404 ON READER SERVICE CARD

PC-File 6.5 Gains Bar Code Support, Speed Enhancements

IMPROVED **ButtonWare's** *dBASE*-compatible, nonprogrammable database now has a relational update feature, letting users post data to other databases, and support for printing up to 14 different bar code formats including ZIP+4 and UPC. *PC-File*, Version 6.5, is also up to 10 times as fast as previous versions, according to the company.

Additional enhancements to the program include a configurable table view, support for query by example, a pop-up calculator, and a fast redefine option for changing field names, edit masks, default data, automatic data, and calculations.

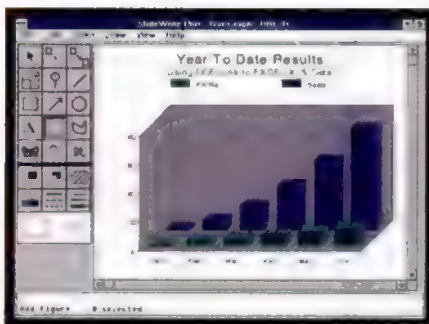
List Price: *PC-File*, Version 6.5, \$149.95; upgrades from previous versions, \$49.95. **ButtonWare**, P.O. Box 96058, Bellevue, WA 98009; 206-454-0479.

CIRCLE 405 ON READER SERVICE CARD

SlideWrite Plus Comes to Windows

IMPROVED **Advanced Graphics Software** is now shipping a Windows version of its DOS-based technical presentation graphics software package, *SlideWrite*. *SlideWrite Plus for Windows* is designed to meet the data analysis and graphing needs of scientific and technical users.

The package combines drawing and text capabilities with scientific graphing, curve fitting, data transformation, and statistical analysis features. A WYSIWYG interface and pull-down menus let users draw, size, and format text on-screen. Charts can be composed of up to 20 graphs, each with a maximum of 32,000



SlideWrite Plus for Windows accepts data for any Windows application supporting dynamic data exchange (DDE).

data points. The program ships with a collection of vector-based clip-art images, and a number of specialized technical clip-art libraries called *Figure Packs* are available. Vector images can be enlarged, reduced, rotated, and stretched without loss of resolution.

SlideWrite Plus for Windows accepts ASCII files and Lotus .WK1, .WK3, and .WKS files and has dynamic data exchange (DDE) support. It runs with a wide variety of output devices including printers, plotters, and 35-millimeter film recorders.

List Price: *SlideWrite Plus for Windows*, Version 1.0, \$445. **Advanced Graphics Software Inc.**, 5825 Avenida Encinas, #105, Carlsbad, CA 92008; 619-931-1919.

CIRCLE 406 ON READER SERVICE CARD

RightFAX 2.0 Offers Network Faxing Solution

IMPROVED **Cracchiolo & Feder's** *RightFAX*, Version 2.0, a network fax utility that lets users send and receive faxes from individual workstations, is a complete redesign of the previous release that incorporates client-server technology and a Windows 3.x front end, according to the company. The new version supports a wide variety of fax boards and includes additional international character set support for worldwide communications.

RightFAX provides routing options and can be configured to respond to tone and voice prompts. It supports *NetWare* and Microsoft's *LAN Manager* and features a new Windows fax viewer for document editing.

List Price: *RightFAX*, Version 2.0, \$1,995. **Cracchiolo & Feder Inc.**, 4400 E. Broadway, #600, Tucson, AZ 85711; 602-327-1357.

CIRCLE 407 ON READER SERVICE CARD

Fujitsu Unveils Heavy-Duty Printer With Low Price Tag

NEW **Fujitsu** is now shipping a sub-\$2,000 24-pin dot matrix printer designed to handle continuous multipart forms and large print jobs. The DL5800 has a claimed draft printing speed of 504 characters per second, and it features intelligent paper-handling.

Continuous forms and tractor-feed paper are loaded through bottom or rear slots; single sheets are loaded manually or via single-, double-, or triple-bin sheet-feeders. The unit has automatic tear-off and a paper-parking feature, which lets users switch between the different feeds. It ships standard with six fonts and has a slot for font cartridges.

List Price: **Fujitsu DL5800**, \$1,995. **Fujitsu Computer Products of America Inc.**, 2904 Orchard Pkwy., San Jose, CA 95134; 800-626-4686; 408-432-6333.

CIRCLE 408 ON READER SERVICE CARD

**The Creators
Of AutoCAD Have
Just One Thing
To Say To
All Those Who
Have Stubbornly
Refused
To Learn CAD.**



"You

We have to admit, you're persistent. Year after year, you've had the same objections to learning CAD. So we've finally decided to do something about them.

Objection #1:

"IT TAKES TOO LONG TO LEARN."

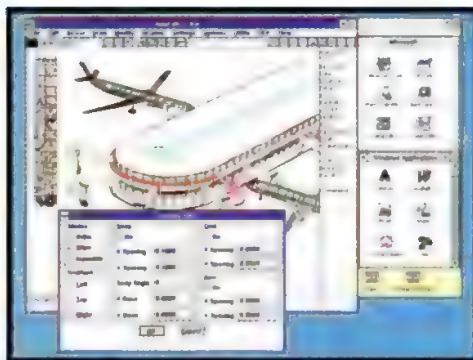
Not any more. Now AutoCAD® runs on Windows.™ That means you get all the advantages of AutoCAD without memorizing command names. Instead, you create your drawings by selecting simple Windows tools and icons. So your learning curve is much shorter.

Objection #2:

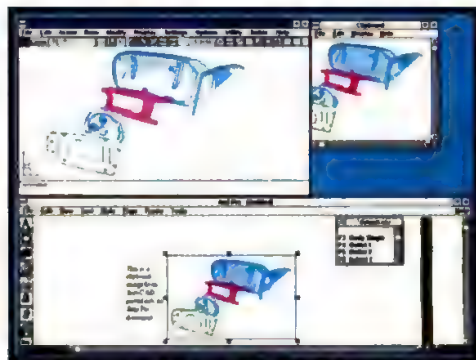
"I CAN'T DESIGN ON A COMPUTER."

Windows helps change all that. Its intuitive interface and pull-down menus eliminate most of the repetitive key-boarding that makes computer work feel confining.

The AutoCAD Release 11 Extension for Windows also lets you move back and forth effortlessly between other Windows applications. So you can work the way that comes naturally to you. Create a brilliant drawing on



The intuitive Windows interface, tools and icons make AutoCAD far more accessible.



With the Windows clipboard, AutoCAD drawings are easily added to documents and presentations created on desktop publishing, paint, drawing or word-processing software.

Now AutoCAD

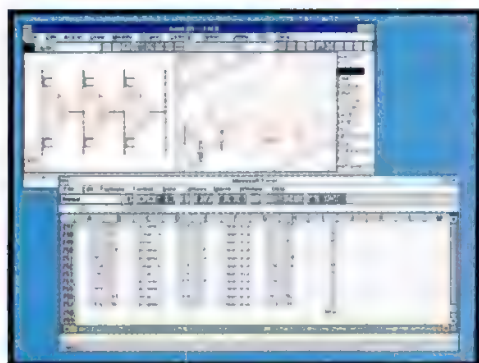
AutoCAD. Write the specs on your word-processor. Then use the Windows Clipboard to insert both pieces into a desktop publishing program, so you can polish your proposal.

Objection #3:

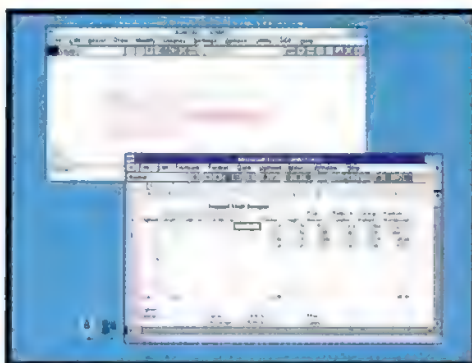
"I CAN WORK FASTER BY HAND."

Okay, let's be honest about this. Maybe you and your pencil can beat the blazing speed of AutoCAD for rough sketching. But AutoCAD leaves your pencil in the dust

Win.



Using Dynamic Data Exchange, you can eliminate many repetitive tasks by linking AutoCAD to other Windows programs.



AutoCAD gives you the tools to link your drawings to spreadsheets. So you can explore the possibilities of parametric design.

Runs On Windows.

when it comes to designing, making revisions and creating multiple views.

That's not all. AutoCAD on Windows has another way to make you more productive. It's called Dynamic Data Exchange (DDE). With DDE, information flows in both directions between AutoCAD and other Windows applications, like Microsoft® Excel® and Lotus 1-2-3®.

So when you update an AutoCAD drawing, new costs can be automatically computed on your spreadsheet. And

when you update your spreadsheet, it can revise your AutoCAD drawing for you. See how long that takes you by hand.

With the new AutoCAD Extension for Windows, all the advantages AutoCAD users have been hoarding are now accessible to you. Now your files will be instantly transferable, and your work compatible with more than 650,000 other AutoCAD users. That

probably includes many of your clients and colleagues. In addition, you can use the power of programs like Microsoft Visual Basic™ or Borland Turbo C++™ to create custom CAD applications that fit the work you do.

Only \$99* for AutoCAD Release 11 Users.

Still on the fence? Call 1-800-445-5415 ext. 680 for the name of the nearest Authorized AutoCAD Dealer, who will give you a free demo.

 **AUTODESK**

New & Improved

BRIEFS

CONTINUED FROM PAGE 60

transfer rate and a 0.1-ms. access time, depending on the host SCSI controller and host operating system. The unit is available in configurations ranging from 4MB (\$4,700) to 512MB (\$39,660). 800-678-3726, 316-685-4904.

Parallel Peripherals is offering a new line of 2.5-inch external hard disks that attach to any PC via a parallel port. The 1.5-pound units are available in configurations ranging from 40MB (\$499) to 360MB (\$1,999) and use on-the-fly compression techniques. 800-222-7240, 714-394-7244.

Prima Storage Solutions' new PDQ external hard disks are available in configurations of 85MB (\$999), 120MB (\$1,299), 200MB (\$1,799), 360MB (\$2,499) and 535MB (\$3,349). They attach to any PC via a parallel port. The units employ installation software that detects interrupts, speed, and other parallel port characteristics, and installs a machine-specific driver for optimum performance. 800-288-8273.



TAPE BACKUP

Computer Logics has

released a new version of its drive software for its NineTrack series of tape drive systems. Version 5.20 has a number of backup options and ships with every NineTrack controller kit. The basic kit (\$895) includes the software, a controller board, and an interface cable. 800-828-0311, 216-349-8600.

GigaTrend has unveiled the Turbo SL series of 5-gigabyte, half-height, 5.25-inch DAT (digital audio tape) storage drives. The Turbo SL series is fully *NetWare 386* compatible, employs flash memory for future upgrades, and uses a new data-compression technology that is up to 20 percent as fast as existing compression technologies, according to the company. Units are available in 20 different configurations; prices range from \$4,150 to \$8,150. 619-931-9122.

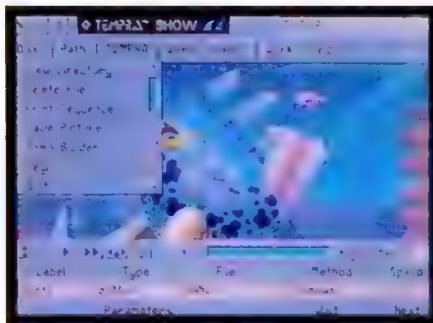
Tallgrass Technologies is shipping the FS3000 (\$4,495), an internal QIC tape-backup unit. The unit employs data compression to provide up to 2.7MB of storage capacity on a single tape cartridge. An external MCA model (\$4,995) is available. 913-492-6002.

Multimedia Authoring Under DOS and Windows

NEW **Mathematica**, makers of *Tempra Pro* and *Tempra GIF*, is offering *Tempra Show*, a multimedia authoring package for both DOS and Windows. When combined with *Pro* and *GIF*, *Show* lets users scan images, capture video and slides, and import images for producing multimedia and videotape presentations.

The package's graphical user interface runs the presentation as it is being created and provides 26 screen wipes at 99 speeds. It supports more than 15 sound boards and lets users integrate voice, music, and animation into presentations.

Tempra Show accepts video images processed by *Tempra Pro* and *Tempra GIF*, Autodesk's *Animator*, *Animator Pro*, and *3D Studio .FLI* and *.FLC* files, and supports *.PCX*, *.TGA*, and *.CEG* file formats.



Tempra Show's Demo Builder lets users create royalty-free multimedia presentations for distribution.

List Price: *Tempra Show*, Version 1.0, \$199. Mathematica Inc., 402 S. Kentucky Ave., #210, Lakeland, FL 33801; 800-852-6284, 813-682-1128.

CIRCLE 400 ON READER SERVICE CARD

By Design: Desktop Publishing Within WordPerfect

IMPROVED **Streetwise Software** is shipping *By Design*, Version 2.0, an update of its desktop publishing package for DOS-based *WordPerfect 5.0* and *5.1*, and *By Design for Windows*, Version 1.0, for use with *WordPerfect for Windows*. Both versions are called up from within the word processor and provide more than 500 graphics images, design tools, and page designs.

By Design includes two new graphics fonts, an expanded clip-art library with 20 new company logos, 15 new page designs, and an enhanced graphics insertion feature allowing users to size and place images into documents from within graphics page preview mode. *By*

Design for Windows includes all the capabilities of the DOS-based package and adds a browse preview mode to each dialog box, as well as page backdrop design tools.

List Price: *By Design*, Version 2.0, \$99; upgrade from previous version, \$29; *By Design for Windows*, Version 1.0, \$99; upgrade from DOS-based versions, \$49. Streetwise Software, 1227 18th St., Suite B, Santa Monica, CA 90404; 800-743-6765, 310-829-7827.

CIRCLE 410 ON READER SERVICE CARD

Iomega Unveils a PC- Powered Bernoulli Drive

NEW Drawing its power from the attached PC, the Bernoulli PC Powered removable disk subsystem from **Iomega Corp.** puts 90MB of storage in a compact housing. The 2.75- by 6.75- by 10.75-inch unit can be attached to any PC with an ISA bus.

The drive provides 90MB of storage in standard mode and 180MB in backup mode by utilizing the drive software's data-compression techniques. A 32K on-drive memory cache and caching software speed the average access time from 19 to 13 milliseconds, according to the manufacturer.

The unit comes standard with an adapter board, a 90MB storage disk, and drive software. It is compatible with all 90MB Bernoulli disks and can read all 44MB Bernoulli disks.

List Price: Bernoulli PC Powered, \$999. Iomega Corp., 1821 W., 4000 S., Roy, UT 84067; 800-456-5522, 801-778-1000.

CIRCLE 411 ON READER SERVICE CARD

SPC Ships InfoAlliance 1.1 for Windows

IMPROVED **Software Publishing's** client-server network data integration package, *InfoAlliance for Windows*, Version 1.1, retains all the functionality built into the original release for *OS/2 Presentation Manager*. The new release, running under Windows, adds access to *SQL Server* data, manipulation of scanned images, support for DDE (dynamic data exchange), and 3GL triggers for programmers who use C libraries to build custom features.

InfoAlliance for Windows has forms design, report writing, and the ability to access and manipulate data from multiple sources such as *SQL Server* and *dBASE*. Data can be stored in the package's native format, and users can choose from standard reports or create custom forms. Information can be exported to charts in *Harvard Graphics*.

List Price: *InfoAlliance for Windows*, Version 1.1, \$495. Software Publishing Corp., 3165 Kifer Rd., Santa Clara, CA 95051; 408-988-7518.

CIRCLE 412 ON READER SERVICE CARD

See us at
PC EXPO
booth #4052

The 386SX with the lowest cost upgrade.



The One & Only

Acer is the only company that lets you upgrade your 386SX computer to a 486 using a single chip. Others ask you to buy an upgrade module, costing \$500-\$1,000.

Four Times the Power

Other PCs let you double your CPU clock speed. But that's all. With the unique

Acer CPU upgrade technology, you can get up to four times your processing power.

The Lowest Cost

There is a lot of talk about upgrades... but the facts are that this AcerPower 386SX allows the lowest cost CPU upgrade on the market.

Get Yours Now!

With AcerPower 386SX, you get 2MB RAM and a 125MB hard drive.

Upgrade		Cost
Acer	Plug in a Chip	\$175.00
Other	Replace a Modular Board	\$500.00

The Easiest Move

To upgrade, just remove the cover, snap in the chip, replace the cover and turn on the power. Your 386SX automatically detects the new CPU to become a full-function 486 computer. All for the price of an Intel CPU chip, available from any electronics or computer store.

Acer. Giving you the power you need tomorrow, today. For more information and your free upgrade brochure, "Protecting Your Computer Investment: A Buyer's Guide to Upgradability", call us today at 1-800-SEE-ACER!

**"The AcerPower 386SX...
boasts the least expensive
upgrade trick yet."**

PC World, January, 1992

1-800-SEE-ACER
US and CANADA

Acer America Corporation
2641 Orchard Parkway
San Jose, CA 95134

Acer

For the Acer logo an registered trademark of Acer America Corporation. The Intel Inside logo and 486 are trademarks of Intel Corporation.

BRIEFS



SPREADSHEET ADD-INS

Intex Solutions is shipping an update to its recovery utility for *Lotus 1-2-3* worksheets. *Rescue Plus, Edition II, Version 3.1* (\$149.95), restores lost, damaged, erased, and corrupted files on both hard disks and floppy disks. The utility has a new full-screen menu and supports *Lotus 1-2-3*, Releases 3.0, 3.1, and 3.1 Plus, as well as *1-2-3 for Windows*. Intex is also shipping *UltraGraphics for DOS, Version 1.0* (\$245), providing more than ten graph styles for users of *Lotus 1-2-3*, *Quattro Pro*, and *Excel*. 617-449-6222.

TechnoJock Software's Advantage, Version 1.0 (\$495), is an add-in object-oriented development kit that works in conjunction with *Turbo Pascal for Windows* to create spreadsheet applications for *Lotus 1-2-3 for Windows*. The package provides a class library for *Turbo Pascal for Windows* and lets users build add-ins to create custom macro keywords, menus, or event applications. 713-493-6534.



WORD PROCESSING

Gilbert & Associates' VIEWz, Version 2.0 (\$395)

per workstation), lets *Ami Pro* users create, open, and retrieve documents on networks running *Mezzanine* document management software from Saros Corp. Users can locate files, perform database searches, and locate documents anywhere on a network from within *Ami Pro*. *VIEWz 2.0* is available from Saros Corp. (206-646-1066) and from Wang Laboratories (404-392-5787).

Lotus is shipping the *Macro Developer's Kit for Ami Pro, Version 1.0*, available free to registered users of *Ami Pro*. The kit includes a macro language manual, a new dialog editor with SmartIcons, example macros of DDE and DLL, and a macro for controlling how *Ami Pro* works with other Lotus Windows applications. 800-831-9679.

Mastersoft is shipping *Windows Word for Word, Version 5.0* (\$79.95), its add-on format-conversion utility for *Microsoft Word for Windows*. The upgrade supports over 30 file formats including *Ami Pro*, *Interleaf Publisher*, and *WordStar 2000*. 602-277-0900, 203-264-9490.

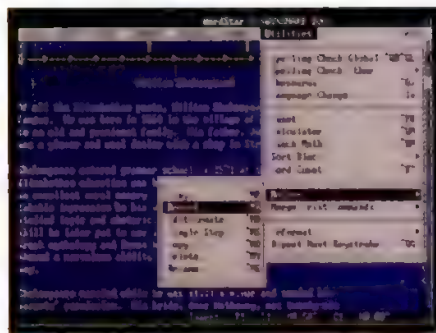
WordStar 7.0 Gets SSA/CUA-Compliant Interface

IMPROVED

WordStar, Version 7.0, is now shipping as an \$89 upgrade to registered users of all previous versions. The update features a new SSA/CUA-compliant interface that includes pull-down menus and redesigned dialog boxes.

Additional features include a macro command language and editable macro recording, fax and mouse support, enhanced graphics file format importing, and support for the Windows Clipboard. The package ships with 51 spreadsheet, word processing, and database file-conversion filters and 175 additional printer drivers.

Page preview mode now supports WYSIWYG viewing of PostScript fonts and the zoom option lets users navigate by mouse, dragging the view box around the page. *WordStar 7.0* automatically checks for expanded memory when it loads, and can load some internal files into EMS to increase program speed.



WordStar's new macro language facility lets users record, edit, debug, and play back a series of commands and actions.

List Price: *WordStar, Version 7.0*, \$495; upgrade from previous versions, \$89. *WordStar International Inc.*, 201 Alameda Del Prado, P.O. Box 6113, Novato, CA 94949; 800-227-5609; 415-382-8000.

CIRCLE 413 ON READER SERVICE CARD

WEB Unveils New Compression Method

NEW

WEB Technologies is shipping two general data-compression utilities that feature a method for lossless compression of any type of file in ratios of 8:1 or 16:1.

WEB DataFiles/8 and *WEB DataFiles/16* employ WEB's new compression methodology, resulting in consistent compression ratios regardless of the type of data being handled. All file types, including large graphics image files and .EXE files, can be compressed with no loss of data. Both utilities offer cross-platform compression and decompression.

List Price: *WEB DataFiles/8*, \$129; *WEB DataFiles/16*, \$245. *WEB Technologies Inc.*, 23 Rumson Ct., Smyrna, GA 30080; 404-514-8000.

CIRCLE 414 ON READER SERVICE CARD

TK Solver Adds Presentation View

IMPROVED

Universal Technical Systems' equation solving software, *TK Solver, Version 2.0*, now sports a new presentation view and macro recording capabilities. Information such as variables, rules, tables, and plots are arranged in an unlimited number of worksheets for presentations. The new version sports 30 more functions than the previous release had.

Users can solve and edit equations within the view, and move or resize data in WYSIWYG mode. Time and date stamps as well as text can be added to information linked to worksheets, and a freeze command changes the status of tables and fields into text so that you can document a problem-solving process.

TK Solver's new macro recorder lets users record macros in two distinct ways: as a series of keystrokes saved under a filename or as syntax and commands for creating and solving equations. It ships with a predefined macro library.

List Price: *TK Solver, Version 2.0*, \$595; upgrade from *TK Solver Plus*, \$195; upgrade from *TK Solver, extended memory version*, \$95. *Universal Technical Systems Inc.*, 1220 Rock St., Rockford, IL 61101; 800-435-7887, 815-963-2220.

CIRCLE 415 ON READER SERVICE CARD

Act! Offers HP 95LX Users Wireless Data Exchange

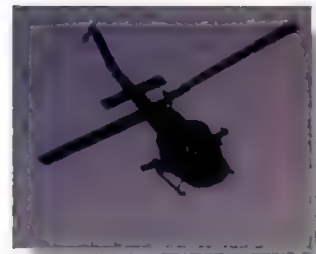
NEW

Contact Software International has a solution to the traditional exchange of business cards. A new version of its popular contact management software, *Act! for the HP 95LX* palmtop PC sports a feature called "ZAP-CARDS." This innovative method allows HP 95LX users running the palmtop version of *Act!* to line up the units' infrared ports and exchange information by pressing Ctrl-Z.

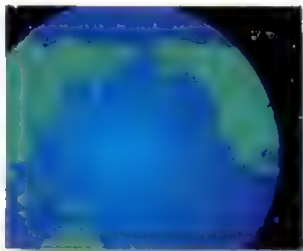
Act! for the HP 95LX includes the features offered in the desktop version, with the exception of word processing. These features include client tracking (up to 4,000 records on the palmtop platform), calendar management, report generation, and expense tracking. Contact records can be transferred between desktop PCs and the HP 95LX via a cable.

List Price: *Act! for the HP 95LX*, \$149. *Contact Software International Inc.*, 1840 Hutton Dr., #200, Carrollton, TX 75006; 800-365-0606, 214-919-9500.

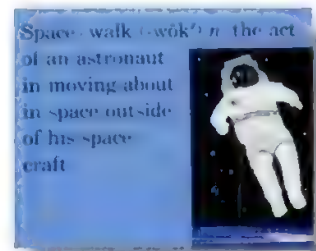
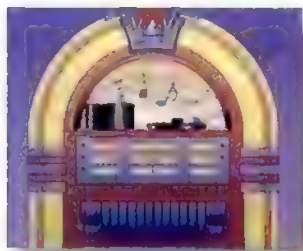
CIRCLE 416 ON READER SERVICE CARD



This isn't an ad for a National Geographic[®] Special, an action movie, the



Discovery Channel[®] or Nintendo[®]. It's an ad for the Sound Blaster Multimedia



Upgrade Kit. Which turns your computer into all of them.

Over \$2000 worth of goodies for less than \$850.

For more information or the name
of your nearest dealer call

1-800-998-LABS



Easy-to-install internal CD-ROM drive. 5 leading CD software titles, including Microsoft Windows with Multimedia Extensions 1.0, Microsoft Bookshelf, Creative Sounds, the Selectware System and Sherlock Holmes, Consulting Detective.

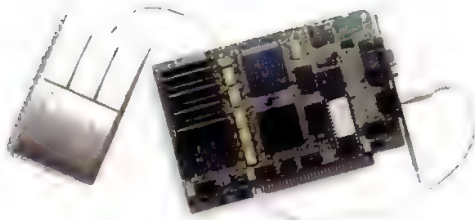
CREATIVE LABS

Outside of North America, call 65 773 0233. fax 65 773 0353. Sound Blaster is a registered trademark of Creative Labs, Inc. Windows and Bookshelf are registered trademarks of Microsoft Corporation. © 1992 Creative Labs, Inc. All rights reserved.

All trade names referenced are the service mark, trademark, or registered trademark of their respective manufacturer or owner.

CIRCLE 086 ON READER SERVICE CARD

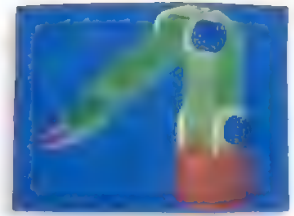
VALUABLE PRIZES



ATI Graphics Ultra GUI accelerator.
Up to 1280 X 1024 resolution
and a 76Hz refresh rate
24X faster than SVGA.



Free 9600/2400 Baud Fax / Modem
with Fax-it for Windows on every
Windows Workstation.



Co-processed video & Vibrant's
DLD driver make the Power
Windows series the
ideal CAD Workstations.

They're here. Our all new, expanded line of Windows Workstations. When it comes to all-out Windows and CAD performance, Standard Computer just made the best even better. We've assembled some of the most highly acclaimed components and software into a series of systems with one objective: to give you the hottest video, the highest overall system performance and the best user

Team the Graphics Ultra up with one of MAG's two top of the line monitors and you're looking brilliant – up to 1280 X 1024 resolution and up to a 76Hz refresh rate.

We think you'll find HyperDisk's disk caching software –

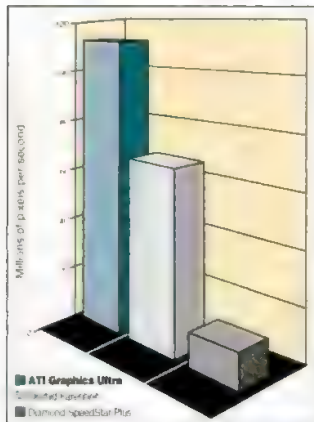
for up to 1000% faster disk drive performance – refreshing as well.

Looking for a better user interface? Well we anticipated that too and included The Norton Desktop for Windows. And if all this isn't enough, we

also include The Complete PC's Complete Modem Plus, Windows 3.0, DOS 5.0, a 130-key keyboard and a three-button mouse from ATI. It's all in there. There's nothing like the Power Windows Series from Standard Computer. Anywhere. At any price.



THE POWER WINDOWS SERIES



ATI beats the video competition hands down.

interface – courtesy of Norton Desktop for Windows – on the market today. Every Windows Workstation incorporates the award-winning ATI Graphics Ultra GUI Accelerator Card, one of the most powerful graphics engines out there. How powerful? How about video speed up to 24 times faster than SVGA.



WINDOWS WORKSTATION-ULTRA



WINDOWS WORKSTATION-PLUS

- ▼ ATI Graphics Ultra Co-processed SVGA card. 1MB VRAM & 512Kb DRAM. Up to 1280 X 1024 resolution & a 76 Hz refresh rate. Built-in mouse port with 3-button mouse included.
 - ▼ MAG 17" flat screen monitor. Up to 1280 X 1024 resolution & a 76Hz refresh rate. LCD info display and digital image sizing control.
 - ▼ Free Norton Desktop for Windows.
 - ▼ Free 9600/2400 Baud FAX / Modem.
 - ▼ 8MB 70ns RAM with 64K SRAM cache.
 - ▼ 340MB <15ms IDE HDD w/64K cache.
 - ▼ HyperDisk disk drive accelerator.
 - ▼ 1.44MB 3.5" & 1.2MB TEAC drives
 - ▼ 2 serial, 1 parallel, & 1 game port.
 - ▼ MS-DOS 5.0 & Windows 3.0.
 - ▼ 130-key keyboard.
 - ▼ Vertical case with 8 drive bays.
- 486•33U \$4,495.00**
EISA SYSTEM INCLUDES SCSI HDD & 32-BIT BUS MASTER CONTROLLER
- EISA486•33U \$5,695.00**

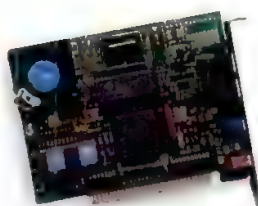
- ▼ ATI Graphics Ultra co-processed SVGA card. 1MB VRAM & 512Kb DRAM. Up to 1280 X 1024 resolution & a 76 Hz refresh rate. Built-in mouse port with 3-button mouse included.
 - ▼ MAG 15" flat screen monitor. Up to 1280 X 1024 resolution & a 76Hz refresh rate. LED mode indicator and Digital image sizing control included.
 - ▼ Free Norton Desktop for Windows.
 - ▼ Free 9600/2400 Baud FAX / Modem.
 - ▼ 8MB 70ns RAM with 64K SRAM cache.
 - ▼ 210MB <15ms IDE HDD w/32K cache.
 - ▼ HyperDisk disk drive accelerator.
 - ▼ 1.44MB 3.5" & 1.2MB genuine TEAC drives.
 - ▼ 2 serial, 1 parallel, & 1 game port.
 - ▼ MS-DOS 5.0 & Windows 3.0.
 - ▼ 130-key keyboard.
 - ▼ Vertical case with 8 drive bays.
- 386•33P \$3,095.00**
386•40P \$3,145.00
486•33P \$3,495.00

IN EVERY BOX.

**FREE WITH EVERY
WINDOWS
WORKSTATION AND
ADVANTAGE SERIES
COMPUTER.**



ATI VGA XL 1024 X 768 SVGA Card. 32,768 colors & a 72Hz refresh rate in every Advantage series computer.



Free 2400 Baud Modem with every Advantage Series computer



MAG 1460 SVGA Color Monitor with a 72Hz refresh rate on each Advantage series computer.



THE NORTON DESKTOP FOR WINDOWS

- ▼ Drag and drop file management
- ▼ Norton backup for Windows
- ▼ Norton disk doctor for Windows and DOS
- ▼ Screen saver, icon editor and much more.

TRW

1 year of on-site service free with every system.



OUR COMMITMENT TO YOU.

- ▼ 30-day money back guarantee
- ▼ Lifetime toll-free tech support
- ▼ No surcharge for credit cards
- ▼ Company POs accepted
- ▼ Leasing programs available
- ▼ APO/FPO orders welcome

1-800/662-6111
IN CANADA CALL **1-800/654-5800**



STANDARD
COMPUTER
We Set the Standard.

12803 SCHABARUM AVENUE, IRVINDALE, CA 91704
PHONE: 818-337-7711 FAX: 818-940-2924
HOURS: M-F 7AM - 6PM, SAT. 10AM - 3PM (P.S.T.)

If you're looking for the best value in a PC., look no further than the Advantage Series from Standard Computer.

We started by adding the industry's hottest Super VGA Card, the ATI VGA XL. ATI's CODE technology



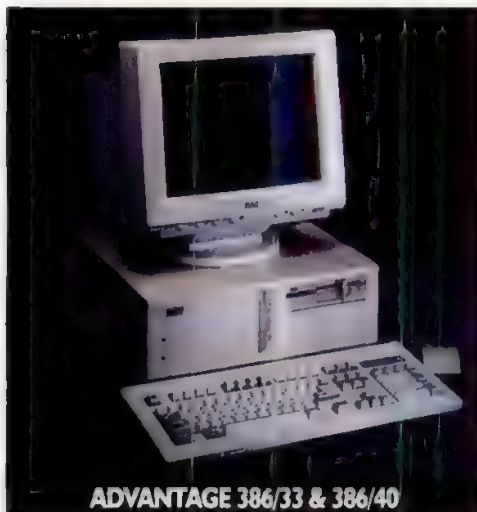
turns 32,768 colors into an effective 262,144. Up to a 72Hz refresh rate at all resolutions and an ATI three-button mouse make this SVGA card unbeatable. Next came the MAG 14" multi-frequency color monitor, which supports the



ATI VGA XL beautifully with full control over image sizing and positioning. You'll also get Norton Desktop and HyperDisk disk accelerator.

We even give you a free Modem, Windows and DOS! So call now. The Advantage Series from Standard Computer.

THE ALL NEW ADVANTAGE SERIES



ADVANTAGE 386/33 & 386/40

- ▼ ATI VGA XL High performance SVGA card with 1MB DRAM. ATI's CODE Technology gives an effective 262,144 colors. Built-in mouse port with 3-button mouse included.
- ▼ MAG 1460 SVGA Multi-frequency color monitor. Supports 1024 X 768 resolution and a 72Hz refresh rate.
- ▼ Free Norton Desktop for Windows.
- ▼ 4MB 70ns RAM with 64K SRAM cache.
- ▼ 130MB <15ms IDE HDD with 64K look ahead cache buffer.
- ▼ HyperDisk disk accelerator software for up to 1000% greater disk drive performance.
- ▼ 1.44MB and 1.2MB genuine TEAC floppy drives.
- ▼ 2 serial, 1 parallel, & 1 game port.
- ▼ 101-key keyboard.
- ▼ Free 2400 Baud Modem.
- ▼ MS DOS 5.0 and Windows 3.0.

386•33A \$1,995.00
386•40A \$2,045.00



ADVANTAGE 486/33

- ▼ ATI VGA XL High performance SVGA card with 1MB DRAM. ATI's CODE Technology gives an effective 262,144 colors. Built-in mouse port with 3-button mouse included.
- ▼ MAG 1460 SVGA Multi-frequency color monitor. Supports 1024 X 768 resolution and a 72Hz refresh rate.
- ▼ Free Norton Desktop for Windows.
- ▼ 4MB 70ns RAM with 64K SRAM cache.
- ▼ 210MB <15ms IDE HDD with 32K look ahead cache buffer.
- ▼ HyperDisk disk accelerator software for up to 1000% greater disk drive performance.
- ▼ 1.44MB and 1.2MB genuine TEAC floppy drives.
- ▼ 2 serial, 1 parallel, & 1 game port.
- ▼ 101-key keyboard.
- ▼ Free 2400 Baud Modem.
- ▼ MS DOS 5.0 and Windows 3.0.

486•33A \$2,595.00
Vertical case add \$99.00

About the only thing Superbase 4 can't contain is your imagination.

Imagine this.

A Windows™ database that can handle virtually any data type.



It's called Superbase® 4 from Software Publishing Corporation. With it, the development possibilities are, well, thought provoking.

Consider bar coding. Think creatively and anything's fair game. One high-security prison, for example, uses Superbase 4 to keep track of their prisoners.



Or how about video?

Through DLL you can store still shots from a full-motion video camera. Or grab key images from a previously recorded tape.

What's more, any photographic or graphic image can be included in any data file. So you can dress up product



catalogs. Personnel records. You name it.

And through DDE you can even pull in everyday business accessories. Like maps, graphs, charts, and spreadsheets.



But this versatility doesn't come at the expense of power. Superbase 4 is fast. It lets you include an unlimited number of characters in any text field. And supporting SQL,

it connects with some formidable



databases—SQL Server, Oracle, Sybase, dBase, and DB2, among others.

In fact, Superbase 4 already manages a direct mail database containing over one million records. It could handle a lot more.

So it's no wonder Superbase 4 is the worldwide market leader in Windows databases.

Just imagine what it can do for you.



Imagine, a free demo disk just by calling 1-800-336-8360, Operator 623.

Superbase is a registered trademark and Superbase 4 is a trademark of Software Publishing Corporation. Windows is a trademark of Microsoft Corporation. © 1991 Software Publishing Corporation, 3165 Kifer Road, Santa Clara, CA 95051

SPC SOFTWARE PUBLISHING

by
Carol Levin

Read Only

Reviews of the Latest Books for the PC User

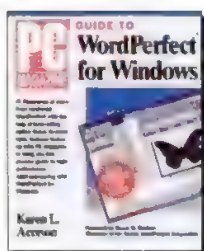
Acerson Scores Again with Her Source Book on WordPerfect for Windows

From its dominant position in the DOS-based word processing market, WordPerfect Corp. has thrown its hat into the rapidly expanding ring of Windows applications with *WordPerfect for Windows*. Its new interface, new macro language, customizable Button Bar, and desktop publishing tools have fed book publishers lots of new material. In the following all-in-one references, you'll find trustworthy guidance and expert advice on working with *WordPerfect*.

Karen L. Acerson, author of the *PC Magazine Guide to WordPerfect for Windows*, takes a pragmatic approach in her tutorial and reference. She is no stranger to *WordPerfect*; she is the former manager of WordPerfect's customer support department and author of the acclaimed *WordPerfect 5.1: The Complete Reference* from Osborne/McGraw-Hill.

Published by Ziff-Davis Press (a division of Ziff Communications Co., *PC Magazine's* parent corporation), Acerson's new 1,021-page source book is written in a friendly style, follows a well-organized structure, and is filled with clear instructions, tips, and screenshots.

Recognizing the software's expanded WYSIWYG tools, Acerson devotes over 150 pages to DTP, with detailed coverage of editing graphics and working with typesetting features. There are more than 100 pages on practical office work: creating letterheads, envelopes, labels, and forms,



and merging and sorting data.

In "Shortcuts and Advanced Techniques," you'll learn to customize the Button Bar, use macros, and create DDE links with other applica-

tions. Providing extra help where the program is weak, Acerson compensates for its limited outlining capabilities by giving clear instructions for creating outline styles. To ease the transition from the DOS version to the Windows ver-

sion, the appendices provide all the help you'll need.

At times, though, Acerson stumbles. In the discussion of sorting data for merges, the book does not adequately warn that the program permanently removes records that don't match in a selective search. There are several useful examples of time-saving macros, but Acerson fails to mention the ENVELOPE.WCM macro that automatically prints envelopes. Instead, she includes three pages of macro commands for printing envelopes. Still, the book's macro coverage goes well beyond the sparse treatment in the manual, and it may

save you the \$19.95 that WordPerfect charges for its macro manual.

Despite its shortcomings, the *PC Magazine Guide to WordPerfect for Windows* is a dependable and practical tutorial to help users master *WordPerfect for Windows*.

—David Angell and Brent Heslop

PC Magazine Guide to WordPerfect for Windows

by Karen L. Acerson, \$27.95, Ziff-Davis Press, 5903 Christie Ave., Emeryville, CA 94608; 800-688-0448, 510-601-2000. ISBN: 1-56276013-0.

CIRCLE 494 ON READER SERVICE CARD

Learn to Craft Polished Documents With WordPerfect Shortcuts and Macros

Alan Simpson's encyclopedic *Mastering WordPerfect 5.1 for Windows* is one of the first books that delves beyond the menus of this massive program and into its entirely new macro language.

Simpson, the author of two books on the DOS version of *WordPerfect*, offers useful macros for assembling documents and other complex functions and follows up with commentary on commands that build the macros. You'll find similarly detailed advice on programmable merges. Until more specialized books on *WordPerfect for Windows'* macro language arrive, Simpson's book has more detail than you'll find outside WordPerfect Corp.'s macro manual.

Mastering WordPerfect for Windows is organized in a now-standard style that takes you



from basic editing and formatting through form letters, graphics, and advanced typesetting functions. It covers just about everything you'll need to know and ends with a series of lessons supplementing the Workbook that comes with the program. Scattered throughout are complex page layouts you can create by following the listed keystrokes. For \$20 you can buy companion disks filled with macros and styles presented in the book.

Simpson is refreshingly straightforward about the dangers and roadblocks built into *WordPerfect for Windows*, and he offers ingenious tricks for getting around them. Other books mention almost in passing that when you use the Sort function to select records from a data file, the program removes from the file all records

that don't match your selection criteria. You won't miss the warning here; Simpson announces it in a large headline and explains in detail how to safeguard your data.

Although the book is well illustrated and full of detailed examples, it is often sprawling and underorganized. It wastes space on prominent marginal notes that merely encourage you to keep trying difficult subjects. And some marginal notes refer to topics that are described only later in the book.

Mastering WordPerfect 5.1 for Windows is a treasure-house of information built on long experience with *WordPerfect*. It isn't the best-organized book, but you'll find information here that you won't find anywhere else.—Edward Mendelson

Mastering WordPerfect 5.1 for Windows

by Alan Simpson, \$27.95, Sybex Inc., 2021 Challenger Dr., Alameda, CA 94501; 800-227-2346, 510-523-8233. ISBN: 0-89588-806-8.

CIRCLE 495 ON READER SERVICE CARD



He's worth over \$6 billion,
owns a \$17 million house in Seattle,
and drives a \$1/2 million Porsche.

But what does he
REALLY want?

HOT WINDOWS PRINTING!

Yes, it's true.

Even the King of Windows—the Big Guy himself—suffers from *painful* Windows™ printing. It's not that he hasn't been interested in finding a cure, it's just that all of his legions haven't managed to harness the power of Windows to make laser printers the efficient, high-resolution output devices that the Big Guy wants.

After all, the Redmondians already own the "Future of the Desktop" with Windows and Windows applications. Maybe they just haven't worked hard enough to get laser printer manufacturers hooked into the Big Guy's vision of *HOT Windows Printing*, instant font swapping, and a price reminiscent of the dot matrix era.

Here is the Solution

On the other hand, there's a high-performance engineering company in Minneapolis that has always provided *HOT Windows Printing*. We're LaserMaster, and since 1986 we've been working in the King's camp to make Windows printing great. Our original Professional Controllers were impressive, but designed for desktop publishers who required camera-ready copy for the pre-press environment.



6900 SHADY OAK ROAD, EDEN PRAIRIE, MN 55344

CIRCLE 237 ON READER SERVICE CARD

Enter the WinJet™ 800

Now our engineers have done it again. This time we've made Windows printing even faster while breaking the price and functionality barriers, too. Now—for only \$995—you can turn an ordinary HP® LaserJet® into the *HOT Windows Printer* you (and the Big Guy) have been waiting for! And if you need an entirely new printer, our WinPrinter™ 800 is the *HOT Windows Printing* solution for only \$2,195.



Our WinJet 800 upgrade kit and WinPrinter 800 provide incredibly fast print speeds, up to 800-dpi quality, 50 scalable typefaces, and special page formatting features. Experience the LaserMaster Windows printing solution, and you'll wonder how anyone could settle for Windows printing on an ordinary HP LaserJet.

Don't Wait For Fast Windows Printing

You don't have to be a Big Guy on Wall Street to be able to afford *HOT Windows Printing*, because today's great Windows technology doesn't just come from Redmond. Call today to learn how *you* can gain the LaserMaster WinPrint advantage. (We even provide a toll-free number, because we know you don't have \$6 billion—yet.)

**Call Today: 800-365-4646 or
612-944-9330.**

DEPT.
077

©1992 LaserMaster Corporation. LaserMaster, WinJet, and WinPrinter are trademarks, and the LM logo and TurboRes are registered trademarks of LaserMaster Corporation. Windows is a trademark of Microsoft Corporation. All other product or brand names are trademarks or registered trademarks of their respective holders. Prices subject to change without notice.

We contemplated asking Bill to pose for this ad, but figured he wouldn't go for it. So, we nabbed the nearest high-bandwidth technoid we could find. Any resemblance to Bill Gates is a by-product of high concentrations of pizza in the operating system.

Read Only

11 Experts from Que Revisit WordPerfect—This Time for Windows

The combined work of 20 writers, Que Development Group's *Using WordPerfect 5.1, Special Edition*, is one of the most detailed and accurate books you can buy on the DOS version of WordPerfect.

It's also one of the few computer books in the same class with Karen L. Acerson's *WordPerfect 5.1: The Complete Reference*. Que has now gathered a panel of 11 WordPerfect experts to produce *Using WordPerfect for Windows, Special Edition*, a book that approaches the earlier volume in clarity and depth.

The new book, for all its massive detail, does not probe as deeply as Que's book on the



DOS version of WordPerfect. It has only a few superficial pages on programmed macros, and its account of sorting and mail-merge leaves out advanced programming techniques.

Its treatment of every other aspect of the program, though, is thorough and accurate. It explains with exceptional clarity subjects that tend to baffle beginners—subjects such as WordPerfect's five types of graphics boxes and the treatment of paper-size options when using Windows and WordPerfect printer drivers. And the discussion of differences between the DOS and Windows versions has details

that other authors (and even the WordPerfect manual) forgot.

The book proceeds from basic editing to graphics and advanced layout techniques, and on to methods for automating your work. Marginal notes offer reminders and quick tips, almost all of them cogent and useful, and warnings are highlighted prominently.

In some details, *Using WordPerfect for Windows* seems slightly distant from the program on your computer. The chapter on macros tells you how to record a macro that prints an envelope, but mentions only in a brief marginal note that you can also use an envelope macro supplied with the program. The note says that you can use the macro if you install a certain keyboard layout, but does not say you can use the macro with any keyboard by selecting it from a list of macro files.

Sometimes the book instructs you to perform complex actions manually when a macro

would make the job easier. For example, it suggests you use the Replace feature to replace a date code (which always shows the current date, no matter when you created the file) with the date on which you mail a form letter. It does not explain that a simple macro can do the job without making you type the date in the Replace menu.

Fortunately, these are small blemishes in a well-researched and reliable book that is rich in information on the basic and intermediate levels of WordPerfect for Windows. Once you know these levels as well as the book explains them, you can probably ascend to the most advanced levels on your own.

—Edward Mendelson

Using WordPerfect for Windows, Special Edition

by Que Development Group, \$29.95, Que (Prentice Hall Computer Publishing), 11711 N. College Ave., Carmel, IN 46032; 800-428-5331. ISBN 0-88022-556-4.

CIRCLE 496 ON READER SERVICE CARD

GREAT THINGS COME IN SMALL PACKAGES

This powerful print server can tackle your biggest network printing problems

- Connects any parallel printer directly to your Ethernet LAN
- Fully Novell Netware 286 and 386 compatible
- Can attach to 8 file servers simultaneously
- Fast and easy to install
- Combines high-speed printing and exceptional printer control
- Supports encrypted passwords, forms, notify, cancel, and others
- Full one-year warranty and unlimited free technical support
- Made in the U.S.A.



Make the Rose Connection

10850 Wilcrest Drive • Houston, Texas 77099 • Phone (713) 933-7673 • Fax (713) 933-0044

ROSE
ELECTRONICS

1-800-333-9343

CIRCLE 290 ON READER SERVICE CARD

telemart

Advancing with Technology

WINDOWS



NEW!

MICROSOFT
Software for people,
not computers.

Microsoft Windows v3.1
NEW Version makes your PC easier to use. Offers better support for MS-DOS based applications. Faster printing and better output with TrueType font technology. Improved Setup, automatically loads Windows onto your system and maintains your current configuration.

Call

Microsoft Works for Windows
Provides the essential business tools you need to run your growing business. You can use Works to write, calculate and analyze numbers, create mailing lists, generate sales and financial reports and design logos and diagrams.

\$118

Microsoft Project for Windows
Microsoft Project for Windows brings new ease and flexibility to project management. You get the power and versatility to manage your schedules and resources better, so you can be more organized and efficient.

\$412

OFFICE ON THE GO

LAPTOP

Apogee	
Thumbelina Portable Mouse	\$59
Battery Watch Pro	29
Brooklyn Bridge	85
Laplink Pro	99
Leading Edge LT300+	1439
Logitech Mouseman Serial	
Cordless	82
Microsoft BallPoint Mouse	110
MicroSpeed MicroTrac	54
VGA Dimmer	23
Winconnect	59

PALMTOP

Paget Hand Held	3916
-----------------	------

NOTEBOOK

AST	
Exec 386SX-20 40MB	\$1905
Everex	
Tempo LX 386SX - 20 1/20 Mb	1915
NoteStar	
386SX-20 2/40 MG, 1.44 VGA	1746
386SX 20 2/80 MG, 1.44 VGA	1862
Panasonic	
All Models	Call
Texas Instruments	
2860 20MB	529
3000 40MB	1822
3000 WINSX 386/80	2481
Other Models	Call

OCR/SCANNERS

Complete	
Full Page GSW Wordscan	\$635
Half Page 400 DPI	109
DPI	
Scanner HS-3000+	146
Logitech	
Logi Scanner 256 for PS/2	289
Logi Scanner 256	259
SOFTWARE	
Catch Word for OCR	\$132
CAT Reader Pro 1/2 Page	156
Complete OCR/HP + 400	175
OmniPage 386 Windows	436
Wordscan + 286/386 2 Mb	647

TERMINALS

Wyse	
30+	\$275
60	269
150	307
180	354

CD ROM/MULTIMEDIA

HARDWARE

NEC	
CD ROM INT CDR-36 XT/AT w/inf	\$455
CD ROM EXT CDR-73	649
CD ROM INT CDR-83	385
COREL Blockbuster Bundle INT	915
Panasonic Worm 940 MB	2389
Sony	
CD ROM INT w/inf bundle	419
CD ROM EXT	455

SOUND CARDS

Creative Labs	
Sound Blaster	\$186
Sound Blaster Pro	185
Ad Lib Music Synthesizer Card	72

SOFTWARE

Atlas Pak	\$63
CD ROM Draw	421
Mammals	87
NEC Type Gallery PS	235
Where in the World	
is Carmen San Diego Deluxe	61

SMART & FRIENDLY

CD ROM Bundle	
Sony CD-525 Drive, Interface, Cable, Disk Caddy & Audio Play Software	
Special Software Bundle Prices	
Internal	\$345
External	395
* Bundle Reg. Low Price	
Classic Collection +	39 73
Toolworks Bundle	82 NA
Family Doctor	41 49
Kings Quest V	33 39
Library of the Future	59 188
Mixed up Ma Gooses	33 39
Nat Geographic	44 98
PC SIG Library	29 NA
Stellar 7	33 39
Wing Commander	45 89
Zip Plus +	45 123
14 Other Titles	Call

HARDWARE

Eagle	
NE2 Netw LT Combo Add on (3.5)	\$259
Netware LT Combo Add on (3.5)	204
Netware LT Combo Add on (5.25)	204
Netw LT Combo NE/2000 Strt (3.5)	400
Netw LT Combo NE/2000 Strt (5.25)	400
Arbsoft	
Lantronic 2MBPS Starter	331
Lantronic Ethernet Starter	455
Standard Microsystems	
Ethercard Plus 8 bit Elite	118
All Other Models	Call
Tiara	
All Other Models	Call



Hayes Ultra 144
Ultra 144 - V 32bis/14,400 bps advanced standalone modem. Dial-up or leased line operation and throughput to 38,400 bps with V 42bis data compression and V 42 error-control. Also provides X.32 (Dial X 25 PAD), MNP 2.5, free Smartcom E2 software and Automatic Feature Negotiation.

\$734

HARD CARDS

Plus Development	
II XL50 MB	\$295
II XL105 MB	439
Other Models	Call

WORD PROCESSORS

Grammatik IV	\$156
LetterPerfect	128
MS Word 5.5	203
RightWriter	158
WordPerfect 5.1	286
Wordstar 7.0	280

DISKETTES/TAPES

Sony	
3.5 D/S D/D (100)	\$70
3.5 H/D (100)	715
5.25 D/S D/D Disks (100)	80
5.25 High Density (100)	87

PCMS1292

ACCPAC Simply Accounting	\$89
Adobe Illustrator Windows	303
Adobe Streamline Windows	120
Adobe Type Manager Windows	59
After Dark	27
Ami Pro 2.0	275
Toolbook	280
Becker Tools	70
Borland C++	289
Carbon Copy for Windows	111
Chansma	322
Corel Draw 2.0	359
Crosstalk for Windows	115
IBM Curlew	213
uFast	325
Designer	446
Facelift for Windows	59
Facelift for Windows ValuePak	117
Grammatik for Windows	55
Harvard Graphics for Windows	339
HDC FirstApps for Windows	53
HDC ICON Designer	32
HDC Windows Express	53
Lotus 1-2-3 for Windows	395
MS Entertainment I,II,III	25
MS Excel for Windows	283
MS Money for Windows	42
MS Office for Windows	84
MS PowerPoint for Windows	293
MS Productivity Pack	36
MS Publisher for Windows	118
MS Word for Windows	293
MS Works for Windows	118
Norton Desktop	59
Objectvision	94
On Target	438
Omni Page 386	250
On Time for Windows	70
PC-Kwik Power Pak	69
Packrat v4.0 for Windows	64
PageMaker 4.0	499
PERFORM Pro	178
Pictureize	90
PFS Professional Write Plus	158
RightWriter for Windows	53
Superbase 4	451
Turbo C++ Windows	93
Ventura Publisher Gold/Windows	499
WinConnect	59
WINFAX Pro	70
Windows	119
WordPerfect for Windows	256
Wordscan 286/386	193
Wordscan + 286/386	647

CO-PROCESSORS

Cyrix	
80387-DX 25	\$145
80387-DX 33	158
80387-SX-18	90
Intel	
80387-DX 33	202
80387-SX-16	120
80387-SX 20	133
Others	Call

KEYBOARDS

Keytronics KB181Plus	\$96
----------------------	------

FORM PROCESSING

Formtool Gold 3.0	\$53
-------------------	------

PERFORM 2.1	88
-------------	----

LIST MANAGEMENT

Avery Label Pro (Laser or Dot Matrix)	\$46
---------------------------------------	------



Hayes Smartcom Exec
Smartcom Exec - Powerful communications software with text editor, error-control protocols, terminal emulations LAN support, mouse control and SCOPE scripting language. For PC, PS/2 and compatibles.

\$65

NETWORKING & LAN

SOFTWARE

ACCPAC BPI LAN	\$230
Act v2.1 Server w/S Nodes	720
Dac Easy Network Acct	180
Data Easy LAN 3-Pak	511
Direct Access Network Unlimited	355
Foxbase Plus LAN	281
FoxPro LAN 2.0 - 6 Pak	515
Lotus 123 2.3 Node	342
MS Excel Exec License Pack	234
Netroom Single (dual)	58
Norton PC Anywhere LAN	316
Novell NetWare Lite	65
Novell NetWare 386 10 Pk	1371
Peachtree Network	435
Print Q LAN (4 User)	269
Procom + LAN - 5 Pak	319
Q & A Network Pack	320
Quattro Pro LAN	316
WordPerfect Additional User 5.1	195

HARDWARE

Eagle	
NE2 Netw LT Combo Add on (3.5)	\$259
Netware LT Combo Add on (3.5)	204
Netware LT Combo Add on (5.25)	204
Netw LT Combo NE/2000 Strt (3.5)	400
Netw LT Combo NE/2000 Strt (5.25)	400
Arbsoft	
Lantronic 2MBPS Starter	331
Lantronic Ethernet Starter	455
Standard Microsystems	
Ethercard Plus 8 bit Elite	118
All Other Models	Call
Tiara	
All Other Models	Call

CAD & ENGINEERING

Auto Sketch 3.0	\$140
Design CAD 3-D	189
Generic CAD 4.0	291
Generic CAD Starter Kit Level II	85
Math CAD	298
Summasketch 12x12 II 4 or 16 Butn	315

Summasketch 12x18 Pro II 4 or 16 Butn	539
Turbo Cadd	75
CalComp	
33120-34 Dig12x12 16B	289
33120-34 Dig12x12 4B	289

PERSONAL FINANCE

Quicken 5.0 (DOS) \$91
Tobias Managing Your Money v.8.0 94
Wealth Builder 90



Close-Up 4.0 for Windows & DOS
Winner of PC Magazine's "Best of '91". New remote Close-Up lets you take control of PCs miles away by modem. View & operate any Windows, DOS or VGA/EGA graphics program at record-breaking speeds. Close-up Dual Pack includes both host and remote sides.

\$119

UTILITIES BACK UP

Back It 4 \$72
Central Point Backup 75
Fastback Plus 3.0 115
Norton Backup 59

GENERAL

Copy II Option Board Deluxe \$119
Copy II PC 6.0 23
Norton Editor 65
Norton Antivirus 65
Super PC-Kwik 43

HARD DISK MANAGEMENT

Lotus Magellan \$95
Mace Utilities 1990 32
Norton Utilities 6.0.1 96
PC Tools 7.1 41
SpinRite II 59
XTREME Gold 2.5 32

MEMORY MANAGEMENT

Onemem 300 \$58
Netroom Single 59

MENUS SOFTWARE

Power Menu Plus \$81

PRINT

Print Q v5.0 \$79
Sideways v3.3 54

SCREEN SAVERS

After Dark \$27
Intermission 27

"I just wanted to thank you. I was in a hurry to get a portable mouse, and couldn't seem to find one I liked locally. Saw an ad in PC Magazine for the new MicroTRAC by MicroSpeed. MicroSpeed referred me to you, and you got it to me in two days! I really appreciate both the availability of this new product and your prompt and courteous service."

Leslie Harckley
San Diego, California
October 31, 1991

COMPUTERS DESKTOP

MIT SYSTEMS - Free Shipping!
30-Day money-back guarantee!
All systems equipped with Natonwide On-Site Service, AMI BIOS, DOS 5.01 Easy DOS Int, 1.2 Floppy, Focus 2001 Keyboard, P, 25, 0 ports, HD/FD & Video Controller
386SX25 1MB, 14" VGA 40/80 M \$1029
386-25 1MB, 40/80 M, 14" SVGA 1199
386-40/128C, 4MB, 130/260 M, Win 3.0 & Logi Mouse 14" SVGA (1M) 1739
486-33 EISA, 4MB, 340/680 M, Win 3.0 & Logi Mouse, Non-Int'ed SVGA 4295
486-33/128C, 4MB, 210/425 M, Win 3.0 & Logi Mouse, Non-Int'ed SVGA 2399

PRINTERS LASER

Epson
Action Laser II \$699
Hewlett Packard
Desk Jet 500C 753
Laser Jet III 657
Laser Jet III 1583
Laser Jet III P 1083
IBM LaserPrinter 1109
NEC Silentwriter II Model 90 1525
Okidata
OL-400 Pw 619
OL-830 1339
OL-840 1539
Texas Instruments
Micro Laser 834

DOT MATRIX

Citizen Printer
200CX 15 \$305
GSX 140 289
Other Models Call
Epson
LQ570 269
LX810 159
Other Models Call
NEC All Models Call
Okidata
184T IBM 230
321 ML Pw 447
PaceMark 3410 1304
Other Models Call
Panasonic
1123 209
1124 289
1695 375
New 2000 Series Call
2624 395
Other Models Call
Star Micronics
NX 1001 140
NX 1020 Rainbow 184
Other Models Call

OTHER

Canon BJ-10EX \$330
Seiko Smart Label + Printer 133

COMMUNICATION HARDWARE

ATI
2400 ETC INT w/SW \$129
2400 ETC EXT 149
Cardinal All Models Call
Complete 292
Communicator Call
Other Models Call
Everex
Evercom 12 INT 48
Everfax24/36 INT 250
Other Models Call
Hayes
2400 B 225
2400 + Personal Modem 133
Other Models Call
Intel
2400 B Classic 135
2400 EXT 167
Sensitron Classic 345
Practical Peripheral Call
All Models Call
Prometheus
2400 B w/Software 56
Pro Modem 9600 + EXT 695
Other Models Call
U.S. Robotics
All Models Call
Zoom
2400 EXT V.42 Bis 113
2400 EXT w/4800 fax 85
2400 EXT w/9600 fax 73
2400 INT w/9600 Send/Rec 103
Other Models Call

PROGRAMMING & LANGUAGES

MS C Compiler \$293
MS Fortran Compiler 286
MS Macro Assembler 89
MS Quick Basic 59
MS Quick C 59
MS Visual Basic 119
Turbo C++ Windows 178

MONITORS

Amazing
12" MM 1280 \$75
14" MM 1488 99
14" CM 8484 EX 315
Amdel All Models Call
Arche
14" VGA Paper White 113
14" SVGA 28 1024 X 768 Non-Int'd 339
Mitsubishi
XC 1410 C EGA 235
XC 1429 C VGA 385
Other Models Call
NEC
Multisync 2A 397
Multisync 3F6X 14" 979
Multisync 4FG 15" 909
Multisync 5FG 17" 1447
Multisync 6FG 20" 2799
Pricenton
Pricenton Ultra 1400 425
Pricenton Ultra 1600 845
Sony Multiscan 1304S 14" 609
Zenith ZCM 1492 599

TAPE BACKUP

Colorado Memory System
Jumbo 120/250 INT \$249
Jumbo 60/120 INT 196

OPERATING ENVIRONMENTS

Dr. DOS v6.0 \$128
MS DOS 5.0 Upgrade 64
MS DOS 5.0 OEM 59
MS DOS 5.0 (Microsoft) 49
MS DOS 5.0 (Microsoft) 69
MS Windows Ver. 3.0 88

PROFESSIONAL DESKTOP PUBLISHING

Freedom of Press DOS or Windows \$235
Freedom of Press Light 53
PageMaker 4.0 499
Ventura Pub Gold/GEM 516

PRESENTATION GRAPHICS

Corel Draw 2.0 \$369
Drafix Ultra v4.0 234
DrawPerfect 279
Harvard Graphics 3.0 399
Lotus Freelance Graphics 4.0 313
Lotus Freelance Graphics 4.0 Upgrd 315

DATA BASE MANAGEMENT

Clanon
Personal Developer \$42
Professional Developer 444
Data Perfect 269
Dbase IV 489
FoxPro Dist Kit 449
FoxPro Single User 2.0 449
Paradox 3.5 469
PC File v5.0 84
R & R Relational Report Writer 449

"I am writing this letter to compliment your company on its good service, and help it gives.

Over the last several years, I have had occasion to buy from you. I have always found your prices very competitive and your sales people helpful and courteous.

Keep up the good service."

Robert Ausenhus
Loveland, Colorado
January 25, 1991

FONT CARTRIDGES

Pacific Data 1-2-4 Plus 2 MG \$235
Pacific Data 1-2-4 Plus 4 MG 354
Pacific Data 25 IN 1/11 259
Pacific Data 4 Memory 1MB 97
Pacific Data 4 Memory 2 MB 129
Pacific Data 4 Memory 4MB 235

BOARDS

ATI
VGA Wonder XL 256K \$165
VGA Wonder XL 512K 189
Diamond
Speed Star Hi-Color 180
Speed Star Plus VGA 169
Stealth 1MB w/Hi-Color 259
Everex
RAM 3000 Deluxe 77
RAM 8000 170
Hercules All Models Call
Intel
Above Board + w/2MG P/S 275
Above Board + w/2MG 408
Expands to 8 MG 377
Inboard 386 PC (1MG) 489
Other Models Call
Orchid
Tiny Turbo 286 115
Tiny Turbo Xtra 174
Other Models Call
Paradise
VGA + 256K 105
VGA 1024 512K 190
Video 7
1024 I w/256K 125
Other Models Call

SPREADSHEET

Lotus 1-2-3 Ver. 2.3 \$325
Lotus 1-2-3 Ver. 3.1 359
Plan Perfect 5.1 225

POINTING DEVICES

Logitech Mouseman Serial/PS2 \$85
Logitech Trackman Portable 83
MS Ballpoint Mouse 110
MS Bus or Serial (Bare Bones) 79
Microspeed PC Trac Ser or PS2 70

"Just a letter to thank you for

permitting me to return belatedly the software I ordered from Telemart. The service personnel who implemented the return after your OK were very professional. Your service lives up to its billing. Thanks."

Rory Snow/Arrow Fausett
Berkeley, California
June 14, 1991

DISK DRIVES

Conner
All Models Call
Imagem (Bernoulli)
Beta 44 MG/transportable 858
Beta 44 MG Insider 782
Other Models Call
Mantor
7080 80MG IDE w/CNT 289
LXT 213A 200MG IDE w/CNT 539
Micropolis
All Models Call
Seagate
ST3144A 130 MG 375
ST3096 A MG 289
Other Models Call
Teac
3.5" 144 MG AT 59
5.25" 1.2 MG AT 80
Toshiba 3.5 1.4 MG 50

ACCOUNTING

ACCPAC BPI
AP, AR, GA, INV Payroll \$230
DAC Easy Bonus Pack 4.2 122
DAC Easy Payroll 4.2 59
One Write + Acct. Works 169
Pacioli 2000 27
Pacioli II w/Data Query 210
TimeSlips III 4.0 183

COMMUNICATIONS

Carbon Copy Plus 6.0 \$110
Co/Session Host 70
Co/Session Remote 70
Norton PC Anywhere v4.5 115
PC Anywhere III 25
Procom Plus v2.0 68
Prodigy Start-Up Kit 3.1 25
Winfax Pro 70

POLICIES

- Order Line Hours: Mon-Fri 9am - 10pm, Sat 9am - 5pm, Sun 9am - 5pm
- In Arizona Call (602) 944-0022
- Order Processing (800) 944-1037
- 10am - 3pm Mon-Fri
- Mailing Address: Telemart, 8804 N. 23rd Ave., Phoenix AZ 85021
- Now accepting International Orders
- Call our Fax at (602) 944-1510.
- International orders add 8%
- Call Before Submitting P.O.'s Ask for National Accounts
- Personal and company checks will delay shipping 3 weeks
- Prices, terms, availability & specifications are subject to change without notice
- Add 5% for C.O.D., A.P.O. & F.P.O. Orders
- Money Back Guarantee
- Software ONLY 30 days from date of invoice
- Refund ONLY on Product Price Call for Return Authorization Number
- Must be in Original Packaging
- No Charge for Visa and Mastercard
- We Do Not Charge Your Card Until Your Order is Shipped
- You Pay the Ground Shipping
- 1-10P - \$8.00, 11-20P - \$12.00 (Except Alaska & Hawaii)
- We Pay the Air Difference and Free Air Applies ONLY to Domestic orders up to 20 lbs and over
- All products, including OGA's carry only manufacturer's warranties. We do not honor guarantees, rebates, trial period privileges or promotional programs offered by manufacturers
- No returns on used or misordered product
- We do not guarantee machine compatibility
- Machine compatibility disclaimer does not apply to MIT systems

A Decade of Experience Delivers

SHIPPING

Most orders shipped in 24 hours... with FREE Federal Express



You pay the ground shipping, we pay the air difference!

PRICE

A decade of lowest prices on the products you want.



CONFIDENCE



We do not charge your card until we ship your order. 30 Day Money Back Guarantee on all software. No questions asked.

CONVENIENCE



Extended hours: late nights, Saturdays and Sundays.

SELECTION



When you see this symbol, you're assured that these products have been purchased most often by our national customer base, based on performance and the telemart price.

CALL US FOR CUSTOMIZED ACCOUNT SERVICES

International Orders:

1-602-944-3045

Fax 1-602-944-1510

Canada 1-800-752-0590

Purchase Orders:

1-800-521-1970

Dealers/VAR's:

1-800-521-1982

MIT Systems & Networks

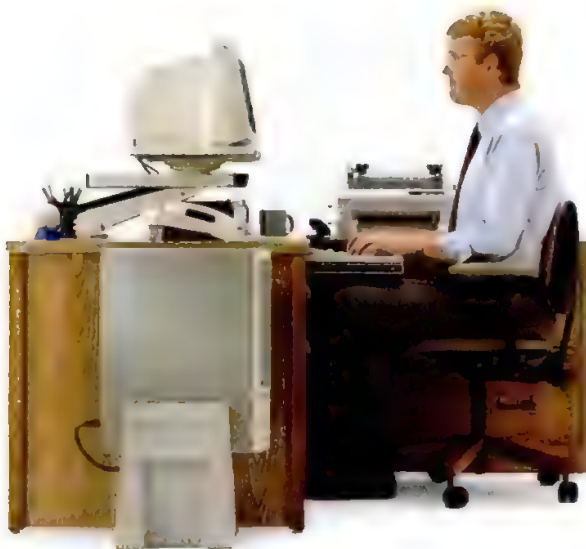
1-800-336-4310



1-800-521-1973



MILLIONS ALREADY PRACTICE ERGONOMICS.



WE SIMPLY PUT IT TO WORK.

Anyone who's ever lounged about in a cozy armchair, TV remote control within easy reach, already knows something about ergonomics. In fact, the science of making the world fit the individual is nothing more than human nature.

But somehow, when it comes to the workplace, human nature gets dropped off at the lobby. And people find themselves in surroundings that more often hinder than help them get the job done.

That's where we come in. As the leader in computer accessories and furniture, we offer more ways to help fit the office to the user. From adjustable keyboard drawers and monitor supports to complete, modular computer workstations.

And right now, we have one thing more.

A booklet telling you how to make your workplace more user friendly, called *"The User Friendly Office"* — *What You Need To Know About Computer Ergonomics.*

It's yours free for the asking when you call (800) 876-6447.

Look at it this way: You spend one third of your life in the office. With a little help from us, you can feel right at home.



**MicroComputer
Accessories, Inc.**

A Rubbermaid Company

edited by
Trudy Neuhaus

Toolkits

Reviews of the Latest Tools for the PC Programmer

OPC: A C++ User-Interface Library For Former TP Programmers

It's probably easier to get a person to change religions than to get a programmer to change editors, compilers, or code libraries. Recent technological advances in several programming languages, such as BASIC and Pascal,

have come about because a core group of devout programmers refused to give up on them. They would see features in other languages and demand that those features be included in new versions of their languages. And nothing whetted programmers' appetites more than C++.

Version 5.5 of Borland's Turbo Pascal introduced the Pascal community to objects. As a result, Turbo Pascal's internal structure, as well as some syntax, came a great deal closer to C++—close enough, in fact, for some Pascal programmers to give C++ a try. Even with its many similarities to their native Pascal, however, C++ still proved to be a difficult language to learn.

Enter TurboPower Software with its Object Professional for C++, a library of user interface routines. Object Professional for C++ (OPC) is a direct port of TurboPower's popular class library for Turbo Pascal, Object Professional (OPRO). It was written for TurboPower by Tech-Mate of Delray Beach, Florida.

OPC's documentation consists of two hefty books. The first covers screen and keyboard routines and the various text-mode window classes, including pick lists, directory and path lists, menus, and a help system. The second manual covers the text editors, file browser, data entry, dialog box, container (that is, stacks, queues, and lists), string manipulation, and



DOS interface classes. The organization is clear and consistent throughout. Each section begins with a general discussion and a full example of how the classes within the section are used. Descriptions of the classes

and their variables and flags come next, followed by descriptions of the member functions.

OPC was written primarily for Pascal programmers migrating to C++. So to an experienced C++ programmer, the code in OPC might look like a Pascal programmer's idea of C++. In addition, if a choice between conventions has to be made, OPC conforms as closely as possible to OPRO rather than the standard C++. But the code is still true C++.

For example, multiple constructors for a Pascal object can have different names. OPRO has constructors like Init, InitCustom, and InitDeluxe. In C++, multiple constructors for the same object all have the same name but different sets of parameters. In order to maintain compatibility with OPRO, OPC divides the task of constructing objects into two steps. In the first step the default constructor allocates the object. The programmer then uses a call to an initialization member function that matches the constructor used in OPRO.

Certain C++ capabilities, such as operator overloading and multiple inheritance, were ignored altogether, since they do not exist in Turbo Pascal and were not necessary to implement the OPRO functions in C++. While this is encouraging news to people with a Pascal background, it is enough to make a C++ purist cringe. We're told future releases of OPC will

have some of the C++ features existing side by side with the Pascal-style code or controlled by a conditional compilation flag. OPC will then offer the best of both worlds.

Another major difference between the languages is the way code is linked in C++ versus Pascal. Turbo Pascal's smart linker eliminates unused code on a function-by-function basis. In C++ the linker will eliminate code on a module-by-module basis. Unfortunately, this means that the OPC source code has to be split into many small modules to gain the best advantage from the linker. The code for some of the bigger OPC classes has been split into over a hundred pieces. Fortunately, the pieces are grouped together in subdirectories to assist programmers who want to refer to the source code.

These and several other differences between OPRO and OPC are clearly documented in the "Notes to Turbo Pascal Programmers" section of the manual.

Having used OPRO for a

you use Version 3.0 of Borland C++. Borland has increased various compiler limits and generally improved the compiler's ability to deal with large libraries. Version 2.0 can also be used, though, and the installation program looks at the Borland C++ files and automatically determines the appropriate libraries to load.

You could program your user interface from scratch or use the MAKESCRN and MAKEMENU utilities to create code for you. These utilities provide a WYSIWYG environment for laying out data entry screens and menu systems, respectively. The objects you create are stored in a library and can be reused and reedited at will. The code generated from these utilities is nicely formatted and contains hooks for optional functions such as error routines and context-sensitive help.

Object Professional for C++ is a powerful class library for user interface design. Although it will primarily appeal to Pascal con-

**Object Professional for C++ utilities provide
a WYSIWYG environment for laying out data
entry screens and menu systems.**

couple of years, I found the transition to OPC fairly painless. OPC uses traditional modular coding techniques, and it is less complex to learn and use than event-driven C++ libraries, despite its size. You will need about 3.5MB of disk space for the library files and up to 10MB more if you choose to include the source code, examples, and utilities. The installation program allows you to choose exactly what files you load to your hard disk.

TurboPower recommends that

verts, its well-written documentation, ease of use, and promise of more C++-specific capabilities make OPC an attractive alternative to the complexities of event-driven C++ libraries.

—Stuart R. Greenberg ■

Object Professional for C++
List Price: \$249. **Requires:** DOS 2.0 or later; Borland C++ 2.0 or 3.0. TurboPower Software, P.O. Box 49009, Colorado Springs, CO 80949-9009; 719-260-6641.

CIRCLE 481 ON READER SERVICE CARD



PS/2

*NSTL test conducted against the PS/2 Model 57 SX without IBM 386SLC processor. **In Canada, call 800 465-1234. IBM, Personal System/2 and PS/2 are registered trademarks of International Business Machines Corporation. ©1992 IBM Corp.

It blows everything else out of the water.

With our new IBM 386SLC processor, the new PS/2® Models 56 and 57 SLC are really making waves. They're faster than any 386 SX computer you can buy—up to 88% faster, to be precise.* They're even faster than most 386 DX systems.

Both models are completely upgradable, to help protect your investment. They're also completely compatible with your existing hardware and software. So in stand-alone or connected environments, about the only thing that changes is how much faster you can get things done.

The new Personal System/2® Models 56 and 57 with IBM 386SLC processor. So fast, you could say other computer companies have missed the boat. For more information, see your IBM authorized dealer. For the dealer nearest you, call 1 800 942-4-IBM, ext. 386.**

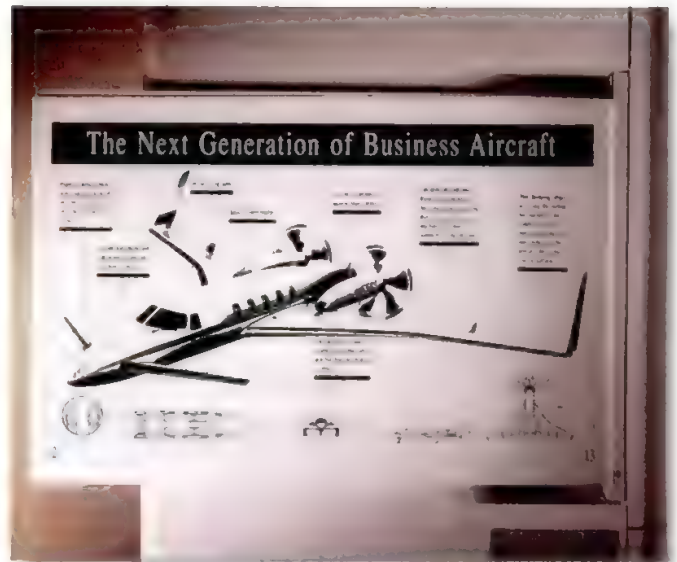
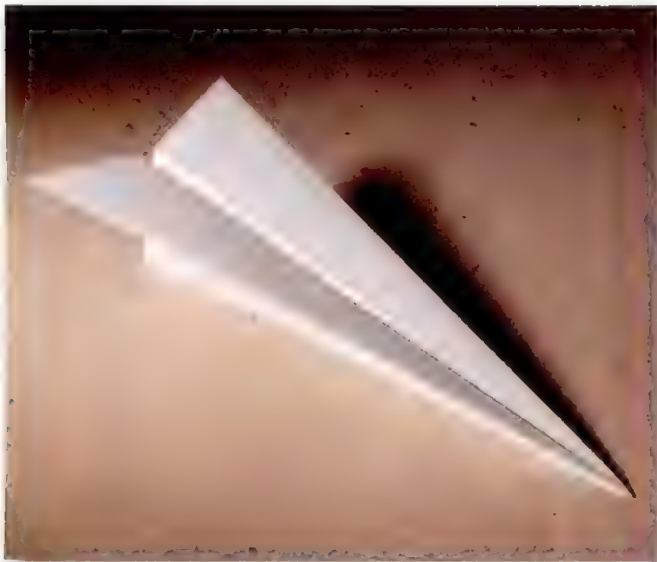
Introducing SLC in the new PS/2 Models 56 & 57.

- Faster than any 386 SX computer you can buy.
- Faster than most 386 DX computers.
- New 386SLC processor with 8K internal cache.
- 4MB memory; 80 or 160MB hard drive, up to five slots/four bays.
- Supports 3.5" and 5.25" diskette drives.

CIRCLE 024 ON READER SERVICE CARD

IBM®





Now there are two ways to make an 11"x 17" sheet of paper fly.

The new LZR 1560 from Dataproducts is a complete departure from ordinary laser printers. At 15 ppm it's not only faster than most laser printers, it can also deliver output up to 11" x 17". Which means it can print spreadsheets, illustrations—any two-page layout—in the time it normally takes to process a letter-size page.

This kind of performance is the result of combining two powerful innovations. Namely, a RISC-based controller, for quicker rendering of fonts and graphics, and PostScript® Level 2, an advanced printing

language that delivers PostScript's vast graphic capabilities faster than ever before.

Plus, while most laser printers

300 dpi can be done with a click of the mouse.

Imagine creating two-page desktop publishing layouts without cutting

and pasting. Or finally getting your full production timeline on a single page that has *legible* 6-point type.

You'll still

have a desk to work on too, since the LZR 1560 is the smallest 11" x 17" printer available. And with one, two or three paper input tray models available, even your biggest jobs are handled easily.

So call 1-800-334-3174 for the name of your nearest Dataproducts dealer. And discover why the LZR 1560 is the only way to fly.

11" x 17" Laser Printer Market Snapshot

SPECIFICATIONS

Manufacturer/Model	Resolution (DPI)	Speed (PPM)/Processor	Page Description Language	List Price
Dataproducts LZR 1560	300x300 OR 400x400	15 Weitek 8200 RISC	Adobe PostScript Level 2 & PCL4	\$5,695
QMS PS2210	300x300	20 Motorola 68020	Adobe PostScript	\$9,995
LaserMaster 400XL	400x400	20 None	Microsoft TrueImage	\$9,995
Varityper VT600W	600x600	7 Motorola 68020	Adobe PostScript	\$16,995
DEC PrintServer 20	300x300	20 N/A	Adobe PostScript	\$25,247
ATI LC6020	300x300	20 Motorola 68020	ATI LaserDrive & PostScript	\$15,995

give you only "enhanced" 300 dpi, ours gives you *true* 400 dpi. So you get outrageously crisp and clean text and graphics. And switching back to



Dataproducts.

The high performance printer people.™



400 dpi offers greater halftone range and sharper images than standard 300 dpi

controller, for quicker rendering of fonts and graphics, and PostScript® Level 2, an advanced printing

© 1992 Dataproducts Corporation. Dataproducts and its associated logomark are registered trademarks, and its tagline and LZR Series are trademarks, of Dataproducts Corporation. All rights reserved. All other product and brand names are trademarks or registered trademarks of their respective holders. Matrix source: Dataquest 1991 and Dataproducts.

CIRCLE 298 ON READER SERVICE CARD

Price breakthrough!
• 400 DPI
• Adobe PostScript Level 2
• 11" x 17" format
• \$5695!

Michael J. Miller



A Long Way from VisiCalc

With the imminent release of new versions of *Excel* and *Quattro Pro*, spreadsheets will be even easier to use.

Ever since Dan Bricklin and Bob Frankston introduced *VisiCalc* in 1979, spreadsheets have all worked in the same standard way. With the next generation of spreadsheets running under graphical operating environments, developers are coming up with new ways for people to interact with their software. The result: We are on the verge of solving some of the problems that have vexed users for years.

Perhaps the most basic of these problems is simply finding the right commands. We've moved from horizontal menus (in products like *Lotus 1-2-3*) to mouse support and pull-down menus (*Quattro Pro* and *Microsoft Excel*) to today's graphical spreadsheets with on-screen buttons representing the most common command choices (*Excel 3.0*'s fixed toolbar and *1-2-3 for Windows*' customizable, movable bar filled with SmartIcons).

Not to be outdone, the new *Excel 4.0* will let you move the toolbar, customize its icons, and even display multiple toolbars (as when you bring up graphics). The upcoming *Quattro Pro for Windows* offers the same feature—its "Speed Bar."

The next great feature destined to become a spreadsheet standard is the context-aware menu. Select part of your spreadsheet and click the right-hand mouse button and you'll get a menu that shows all the things you can do to the selected object. Borland has been showing off this "menus on demand" feature for some time in its public demos of *Quattro Pro for Windows*, but Microsoft will be first out the door with it. Expect Lotus to follow suit.

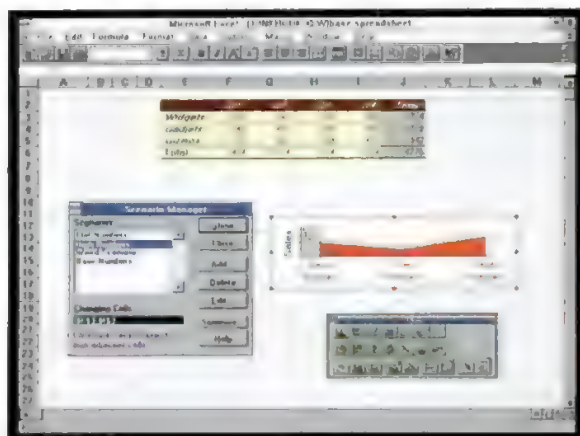
What's next? I certainly like the idea of Wizards, as included in *Excel 4.0*. Essentially, these are predefined macros that step you through complicated processes, such as creating a chart or making a crosstab. Wizards, or agents as they are sometimes called, can make complicated or repetitive tasks easier. I'm excited by the potential.

Another problem that spreadsheet users always face is the difficulty of consolidating in-

formation from multiple sources, such as different departments or sales regions. One early solution was the 3-D spreadsheet, introduced in *Boeing Calc* and later adopted by Lotus in *1-2-3*, Release 3.0. That's a workable solution if you have lots of similar spreadsheets and you have plenty of memory, because the files tend to get very large. Another option is file linking, where you link disparate files by worksheet name and cell location, as popularized in early versions of *Excel*. While more flexible, it's a hard process to maintain. More impressive is *Excel*'s Data Consolidate function, which quickly locates similarly named rows and columns on multiple sheets.

The latest trend is to group a number of sheets together in a notebook metaphor. This gives you some of the flexibility of individual sheets (you can save each file separately), plus some of the advantages of 3-D spreadsheets (such as being able to create calculations that easily sum up a lot of sheets).

Quattro Pro for Windows actually looks like a notebook (with a tab for the name of each sheet). Because the sheets are stored within a larger file, they can have any name you'd like, although in practice you'll want to keep them fairly short. *Excel 4.0* calls its collections "workbooks"; they resemble a book open to



One of *Excel 4.0*'s new productivity features is its Scenario Manager for what-if analysis.

its table of contents. You can keep individual sheets "bound" within the workbook (which lets you give long filenames to each sheet) or "unbound" (so that each individual sheet is

Michael J. Miller

stored separately, with a DOS filename, and can be used in multiple workbooks). Using unbound sheets means that you can quickly switch from a single worksheet to a workbook view and reorder the sheets easily.

Once you've created a spreadsheet, in-

variably someone in your organization wants to make changes to it. Usually, the result is multiple spreadsheets on your disk, all with slightly different names. A better policy may be storing all the different "scenarios" within a single spreadsheet.

SCENARIO MANAGERS

I first saw this concept in Lotus's demonstrations of its Chronicle technology. Ex-

cel 4.0 has a basic implementation of this idea today. Once you've created your spreadsheet, you can select some cells and save them as the original scenario, then add a new scenario in which the values in those cells change. You can then easily switch among the different scenarios to see how other parts of your spreadsheet change. The best part is that it's simple enough that many people will use it.

While button bars, notebook metaphors, and scenario managers are the flashiest changes to spreadsheets, perhaps the most impressive changes are much smaller in scope. One my favorites was the *Excel* 3.0 Autosum feature, which automatically adds a range of cells when you click the button.

Excel 4.0 has more of these little improvements that make using the spreadsheet much easier. A drag-and-drop feature lets you easily move a range of cells. Simply highlight an area, hold the mouse button down, and drag it to a new location. You can copy a selection in the same way by holding down the Ctrl key. It's by far the easiest way of moving and copying cells I've seen.

Similarly, an Autofill function lets you drag a handle on the lower-right-hand corner of a selected cell or block and have *Excel* automatically fill a range of cells. For instance, you can type "Jan" into a cell, click on its handle, and drag it to one of the adjacent 11 cells to fill in the remaining months. You can do the same for quarters or most other things that fit into a basic series.

INCREMENTAL PROGRESS

None of these features make spreadsheets more powerful, but they do make them easier to use. You can be assured that competitive spreadsheet makers will learn from these improvements and come up with a few twists of their own.

Other people are examining the basic spreadsheet concept. *Lotus Improv* and Computer Associates' *CA-Compete* (now for NeXT systems but coming soon to Windows) use a concept of multiple views of a single model. And Dan Bricklin has headed up a team at Slate Corp. to develop *At Hand*, a PenPoint-based spreadsheet that lets you work with a pen instead of a keyboard.

In the end, though, it's the little things that define great software. Consolidation features, Wizards, button bars, and scenario managers are great—but only to the extent that they make it easier for people to get their work done. ■

"I run a business. Every minute counts."

When I needed to save time and increase efficiency in my business, I chose RealWorld® Software. I was spending too much time on the books and not enough time planning for the future.

After automating with RealWorld Software, it was easy to collect money owed from customers, capture discounts for payments, pay employees, track inventory, and print important reports. It took minutes instead of hours.

I can now concentrate on expanding my business and increasing profits. You can too! All you have to do is call.

(800) 678-6336

(603) 224-2200



RealWorld Corporation

RealWorld is a registered trademark of RealWorld Corporation.



YOUR CHOICE JUST GOT EASIER.



FastData 386/33
\$1699

Includes

- Intel 386DX™ 33mhz Processor
- 64K Static Ram Cache
- 4 megabytes of high speed Ram
- 120 mb 17ms IDE hard disk, 1:1 Interleave with 32K cache.
- Desktop Chassis or Mini-Tower
- 1.2mb 5.25" & 1.44mb 3.5" drives
- Non-Interlaced 14" SVGA color monitor, 1024x768 resolution.
- 16 bit 1mb Super VGA card.
- Clock/calendar, parallel port, game port and two serial ports.
- 8 expansion slots, 2 occupied.
- Microsoft Windows 3.1 & Hi-Res Mouse.
- MS-DOS 5.0.

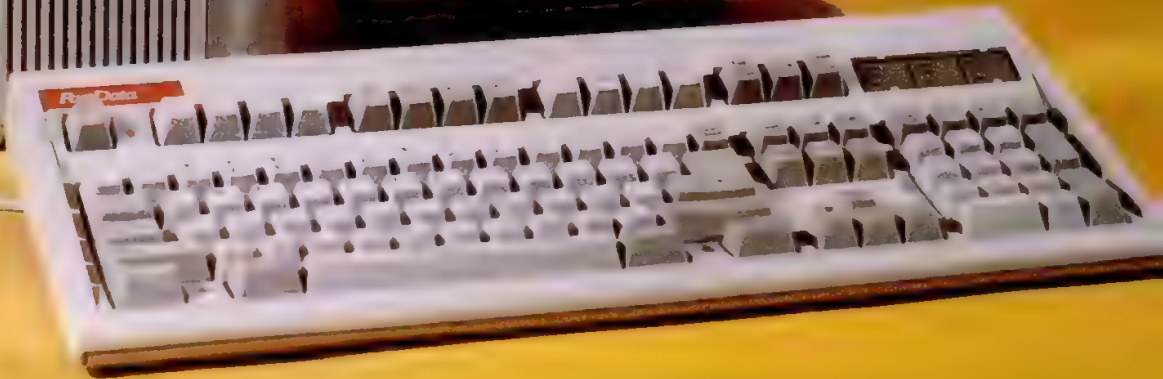
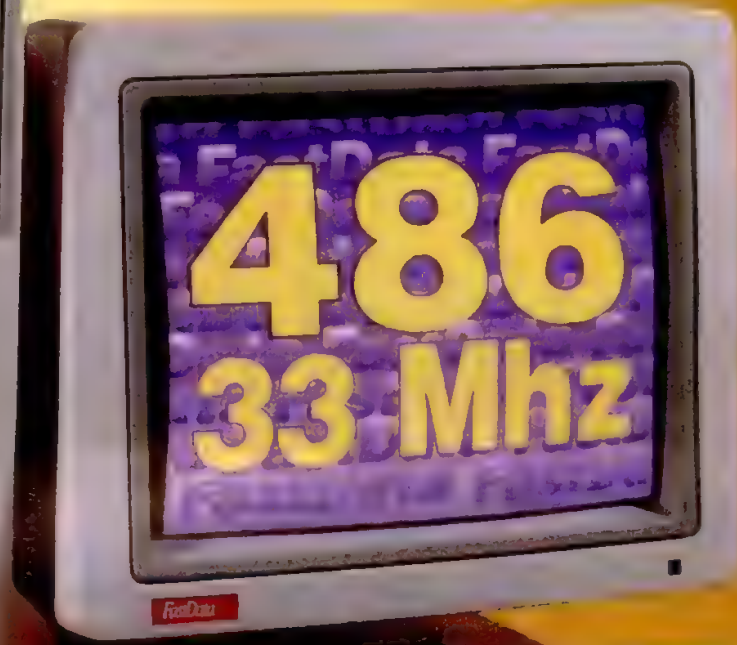
more ➤

FastData 486/33

\$1999

Includes

- Intel 486DX™ 33mhz Processor with Co-Processor & 8K Internal Cache
- 128K External 25ns Cache
- 4 megabytes of high speed Ram.
- 120 mb 17ms IDE hard disk, 1:1 interleave with 32K cache.
- 1.2mb 5.25" & 1.44mb 3.5" drives.
- Non-Interlaced 14" Super VGA color monitor, 1024x768 resolution.
- 16 bit 1mb VGA card.
- Clock calendar, parallel port, game port and two serial ports.
- 8 expansion slots, 2 occupied.
- MS-DOS 5.0, Microsoft Windows 3.1, and Hi-Res Mouse.



FastData Satisfaction

Why buy an underfeatured overpriced PC without full support when you can get your hands on a hot new FastData PC for hundreds less?

"this is a likable computer"
-PC Magazine 10/27/90

Superior Design

You get more of your FastData personal computer because we put more into it. FastMicro's been building PC's longer than most of the competition and we put that experience to work for you. We use proven designs that pass our stringent performance requirements and compatibility standards so it'll be sure to pass yours.



"the component list reads like a Who's Who in the computer world"
-Computer Shopper 6/91

Full Support

Should you have a question or a problem, call us seven days a week. Our support engineers will work with you to solve the problem over the phone. In the unlikely event your system is down, it's our goal to get your system back up - and quick. If a part has failed, we'll get a



GE Computer Service

replacement part out the door via FedEx the same day (Mon-Fri). If that doesn't solve the problem, we'll dispatch GE on-site service or completely replace your computer at no charge to you.

"FastMicro has lasted while scores of other companies have come and gone"
-Computer Buyer's Guide 10/91

Risk Free

FastMicro sells to over half the Fortune 500 and Universities in 49 states. Those who buy for a living rely on us, you can too. Take more than our word on it - purchase any FastData brand product and if you are not thoroughly satisfied within thirty days, you can return it for a full refund.

"bargain hunters may find it hard to resist"
-PC World 10/91

Easy to Buy

FastMicro makes it easy to own a FastData personal computer. Call toll-free seven days to ask a question, get a price, or place an order. Talk to one of our system consultants. Ask your tough questions, we think you'll like our answers. After all, FastMicro wants you as a customer for life, not just today.

FastData 386/SX-20



\$1499

Includes

- Intel 386SX™ 20mhz Processor
- 4 megabytes of high speed RAM.
- 120 mb 17ms IDE hard disk, 1:1 interleave with 32K cache.
- 1.2mb 5.25" and 1.44mb 3.5" floppy drives.
- Mini-Tower (shown) or Desktop Chassis.
- 200 watt power supply.
- Non-Interlaced 14" Super VGA color monitor, 1024x768 resolution.
- 16 bit VGA card with 1mb Video Ram.
- Clock calendar, parallel port, game port and two serial ports.
- Enhanced 101 key keyboard.
- 6 expansion slots, 2 occupied.
- MS-DOS 5.0.
- Microsoft Windows 3.1 & Hi-Res Mouse.
- 30 Day Money-Back Satisfaction Guarantee
- 1 Year Warrantee
- FastMicro Peace of Mind



FASTMICRO

1-800-824-6000



FastMicro, Inc. 4405 East Baseline Road. Phoenix, AZ 85044
U.S. Sales 800-824-6000 / 602-431-8200, FAX 602-431-8300

NewWave for Windows
organizes everything on
your PC to keep you on
top of your work.



**Introducing the NewWave
Desktop Manager for
Windows, version 4.0
from Hewlett-Packard.**

NewWave converts all of your DOS and Windows files and programs into icons. Now you can get the most out of your PC, and your LAN, without using complex DOS, network or Windows commands. Work on the desktop with familiar office tools like the File Drawer, Wastebasket and Printer. Easily drag and drop icons to move, file, copy, print and throw away.

Get Organized.

Organize your PC desktop just as you would your real office. File documents in folders by project and store in the file cabinet. Give your documents meaningful names up to 32 characters long. File wordpro-

cessing, spreadsheet and graphics documents together by project, for easy access.

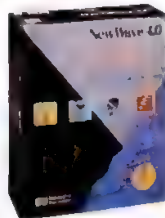
Just click on an icon and both the file and its program open simultaneously. You no longer need to jump between Windows programs and file managers.

**Let "The Agent" do your
repetitive work.**

Once the Desktop Manager has gotten you organized you can have "The Agent" automate your repetitive work. The intelligent macro recorder will watch you complete a task just once and then perform the task upon demand or you can schedule it in advance using the Agent Calendar. "The Agent" will work across all DOS and Windows applications and networks to gather the information you need.

NewWave for Windows will help increase your personal productivity.

**Call 1-800-554-1305,
ext. 110 today for more
information or
to find out how
to purchase
NewWave
version 4.0
(list: \$195) risk-
free for 30 days.**



We're so sure you'll like NewWave version 4.0 that we're offering you a MONEY-BACK GUARANTEE.

**NewWave for Windows. We've
made a great idea even better.**



**HEWLETT
PACKARD**

Bill Machrone



The Perfect Laptop, Continued

Everybody wants to make laptop computers smaller, faster, and more powerful. Let's hope they don't mess them up in the process.

My comrade-in-arms Jim Seymour has taken a lot of flak from a host of readers (as well as some *PC Magazine* editors) who are unable to conceive of a life without a floppy disk drive in their laptops. Fine for them. If they want to carry an extra pound and a half everywhere, every day, they're welcome.

I just hope that all the noise they've generated won't kill the manufacturers' incentives to advance the state of the art of these lightweight notebook computers. If it does, everyone who has to obey the airlines' two-bag rule or who chooses not to carry some monstrous satchel masquerading as a briefcase will surely suffer (including Jim Seymour and me).

Notebooks need to get smaller and lighter. I refuse to carry anything over 5 pounds, but the pressure is on. We use *Lotus Notes* extensively at work. My relatively deskbound coworkers like it well enough.

Those of us who are on the road all the time hate it. *Notes* wants you to be in one place, not wandering around the country. *Notes* on a LAN is a pleasure. At 9,600 bits per second it's agonizing; at 2,400, unthinkable.

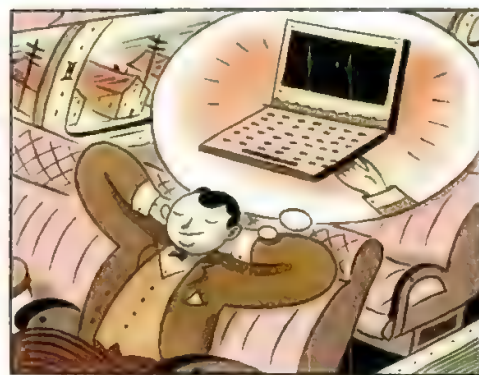
Similarly unthinkable is running *Notes* (which is Windows-based) on my trusty Texas Instruments TravelMate 2000. The 286 just doesn't have enough horsepower, and there isn't enough hard disk space. I'm going to have to look seriously at the NEC UltraLite III, the Compaq LTE Lite/25, and the Toshiba 2200SX. Of the three, the NEC is the lightest, because it doesn't have an integral floppy disk drive. It's a hair under 5 pounds, but it's a little thicker than I'd like.

THE CONVENIENCE FACTOR

Under 5 pounds is a desirable target for all machines, but technology just isn't ready to take us there, at least not with a floppy disk, a VGA screen, and decent battery life, to name a few. We will see (perhaps even by the time you read this) the first of a class of machines that measure roughly 5 inches by 10 inches by 1 inch thick. They'll weigh under 3 pounds but will sacrifice the VGA display for double-scan CGA. The several prototypes I've seen are de-

signed to run on AA penlight batteries. They'll be great note-taking, calendaring, and e-mail machines, and they'll be much handier than current notebooks—more like carrying a Day Timer. You probably won't want to run graphical applications on them, but *GeoWorks* looks surprisingly good in double-scan CGA.

We all need notebooks to become more convenient. I've harped endlessly on the need for a power-down/auto-resume feature that really works. Notebook computers will never be used as notebooks until they turn on instantly. Would you use a Day Timer or a pocket calendar if it took 20 seconds to open to the right page? There are some good examples of sleep mode out there. The new Compaq LTE Lites come to mind. Toshiba has done it reasonably well, but power-down is accompanied by a chorus of utterly superfluous chirps and beeps. It's hard enough not to look like a geek when you're using a notebook computer without having it attract unnecessary attention. My old UltraLite could power-up and be ready to boogie in about 5 seconds. One beep coming up, and nary a peep shutting down. Too bad it had only a 2MB RAM disk. Oh, well. What it lacked in size it made up for in speed.



PCMCIA: RIGHT OR WRONG?

Notebook computer designers are trying to marry the performance and convenience of the original UltraLite with today's needs. You can buy a couple of machines today with a PCMCIA socket. The promise is intriguing: a wide variety of credit card-size modules that slip into the socket to give you the features you want. Multimegabyte flash EPROM storage, high-speed modems, network adapters, cellular

Hassle-Free Printer Sharing

for the HP LaserJet II, IID, III and IIID



"The ServerJet is the smoothest and most practical way I know to share a LaserJet."

Frank J. Derfler, Editor
PC Magazine

Here's how you and your co-workers can have your own HP LaserJet printers... for less than \$75 per user.

It's called the *ServerJet*™.

Simply plug the *ServerJet* into the 'Optional I/O' slot of your HP LaserJet. Stretch phone cable, up to hundreds of feet, to each computer. Then, 12 people can simultaneously *whoosshh* documents to the LaserJet at speeds as fast as 115,200 baud.

No more wandering down the hall with diskette in hand.

Or borrowing someone else's LaserJet.

Or wasting time waiting to print.

The *ServerJet* is available in a variety of models with up to 4MB of buffer memory. And because your office may have printers other than HP LaserJets, ASP Computer Products offers a complete line of printer-sharing solutions.

To order your *ServerJet* or for your FREE catalog, call ASP at:

800-445-6190

International 408-746-2965

ASP
ASP COMPUTER PRODUCTS, INC.

160 San Gabriel Drive, Sunnyvale, CA 94086, USA
Telephone: 408-746-2965 • Facsimile: 408-746-2803

Bill Machrone

communications adapters, you name it. The notebook designers tout the enormous space-saving capability of the socket. But here's a warning. Make sure you have two. One PCMCIA slot is useless, because you'll doubtless want at least two of the features active at the same time. If you have a multimegabyte RAM card plugged in, you sure don't want to sacrifice it just to hook up to the LAN. Or that custom application you loaded into the flash EPROM card may need to use the high-speed modem.

There are right ways and wrong ways to implement PCMCIA cards, too. Chalk one up for Toshiba in the loser's column for its modem. It's a cute little card with this ugly RJ-11 connector that hangs off the side. The card slips into the computer but leaves the telephone connector dangling out in the breeze. With this design, the connector is likely to snap off. Contrast this with AT&T's PCMCIA modem for its new, smaller Safari notebook. The connector is securely built into the Safari, not attached to the card. The PCMCIA spec allows for more pins than just the bus. In this case, AT&T has smartly routed the phone signals elsewhere in the computer.

OH, AND POINTING DEVICES

I still haven't seen one that I like. The Microsoft and Logitech clip-on trackballs work well enough to use with spreadsheets and to pull down the occasional menu, but they leave a lot to be desired. I get a kick out of watching guys with their LTEs on the airplane, trying to play Solitaire. Dragging cards around on the screen in jerky, slow movements takes all the fun out of the game. Appoint's Thumbelina trackball is surprisingly good, considering how small it is, but I wish they'd turn the thing upside down—making it into a tiny mouse.

Call me a traitor, but the best trackball implementation—laptop or desktop—is in Apple's PowerBooks. The low, center-mounted ball has the right weight and feel, and you can use it with either thumb without taking your hands off the keyboard.

Laptop computers are far from perfect, and perfection is very much in the eye of the beholder. The next generation of laptops and accessories will offer far more choices than what we have today. Shop carefully. ■

Now The People Who Pioneered PC Accounting Offer Full-Featured Windows Accounting For Only \$99.

At Peachtree, we've been helping small businesses get their accounting done – quickly and easily – for over 16 years. Now we're taking that tradition one step further.

New Peachtree Accounting for Windows™ Not Just A Better Program. A Better Value.

Peachtree Accounting for Windows is an exciting new update of Crystal Accounting, the first accounting system to take advantage of Windows.



It introduces a host of new features that make excellent use

of Windows' graphical user interface. Plus, it sports the special price of only \$99 – making it by far the best value in Windows accounting.

You'll find all the functions your business needs – General Ledger, Budgeting, Accounts Receivable, Invoicing, Accounts Payable, Payroll, Inventory, Job Costing, and Bank Reconciliation – in one easy-to-use program.

The package includes a Financial Report Writer for customizing your financial statements, and a Custom Forms Generator for designing your own invoices and statements.

On-line help is always available, as well as a complete accounting primer and tutorial. Plus, Accounting for Windows is multi-user capable and fully networkable – right out of the box.

Rave Reviews.

PC Week said our Windows program was "well-designed and well-implemented... anyone with limited PC or bookkeeping experience should be able



to learn the program quickly." And *PC World* says, "if you're looking for a balance between power and simplicity, this is the program to buy."

More Accountants Recommend Peachtree To Their Clients.

More accountants recommend Peachtree than any other brand of PC accounting software.

Maybe it's because we're the people who invented PC accounting in the first place. Or because we've sold nearly half a million software packages worldwide. Or because nobody works

harder to bring you the best value in accounting software.

What's more, we guarantee your satisfaction – and back it up with a 60-day money-back guarantee. So save time and make your money go further. Get new Peachtree Accounting for Windows. See your local dealer or call PeachLine at (800) 428-9973.



Peachtree
The first name in small business accounting software.™

 **PEACHLINE.** There's no way we could squeeze all the features of Peachtree® Accounting for Windows™ into one ad. But if you'd like to talk with one of our people about your specific needs, or you'd just like a free catalog, call PeachLine at (800) 428-9973.



SPEED, SOFTWARE, COLOR VGA & MORE ONLY \$1995!

Your new ZEOS 386SX-20 is ready to ship to you today! We've loaded it up and priced it right. With memory, software, drives and more!

Your new ZEOS 386SX-20 comes complete with 4MB of ultra-high-speed, zero-wait RAM, *plus* our 107 megabyte hard drive, *plus* both floppies, *plus* our 1024 x 768 non-interlaced

For instance, your new system comes with our custom 200 watt power supply and seven-bay SpaceSaver desktop case. You save space and still have room to expand! And the components in your system will last longer because we give you not just one, but *two cooling fans*. After all, the cooler your system runs, the

ZEOS 386SX-20. Loaded. Only \$1995!

**SAME
DAY
SHIPPING!**
Call for
Details.

VGA color monitor offering over 32,000 simultaneous colors (drawn by the awesome 1MB SpeedStar Hi-Color card)!

And at only \$1995, that's just for starters. Because we're also giving you Microsoft Windows and your choice of 2 out of 3 great Windows applications: Lotus 1-2-3 for Windows, Ami Pro 2.0, or Freelance Graphics!

Your ZEOS 386SX also includes the most advanced SX motherboard available. We've not only added incredibly fast DRAM, we've also integrated the hard and floppy drive controllers *plus* the serial, parallel and game ports *right on the motherboard!* This gives you even greater reliability *and* expandability.

ZEOS SX SYSTEMS RATED #1

Your ZEOS 386SX-20 comes from a family of award-winning *Editors' Choice* '386 systems. Recently, ZEOS systems received the #1 SX rating in *PC Magazine's* Service and Reliability issue. When you receive your new ZEOS 386SX you'll see why we rated

#1.

Now Pick 2
of 3: Lotus
1-2-3 for
Windows,
Ami Pro
2.0 and
Freelance
Graphics!



longer it lasts. Now that's value.

24-HOUR-A-DAY TOLL-FREE TECHNICAL SUPPORT AND MORE!

You also receive our legendary 24-Hour-a-Day Toll-Free Technical Support. Plus our full 30-Day Absolute Satisfaction Money-Back Guarantee, One Full Year Limited Warranty and Express Parts Replacement Policy. No one offers you more.

Performance. Quality. Price. Support. These are the hallmarks that have made ZEOS the choice of thousands of satisfied customers in more than 70 countries and what makes ZEOS *your* best choice as well. You're going to be very satisfied. We don't just say it. *We guarantee it.*

ORDER NOW TOLL FREE: 800-423-5891

Order your new ZEOS 386SX now with confidence. Your choice of ZEOS quality is guaranteed. *Call us now, toll free, 800-423-5891.*

All prices and specifications are subject to change without notice. Please call for current pricing and warranty details. ZEOS is a publicly traded company. NASDAQ Symbol: ZEOS. © 1992 ZEOS International, Ltd., 530 5th Avenue, N.W., St. Paul, MN 55112. All product and company names are trademarks or registered trademarks of their respective holders. SXBD-3/4

ALL THIS FOR ONLY \$1995!

- '386SX-20 CPU, 8/20MHz.
- 4MB high-speed RAM providing true zero-wait state performance.
- 107MB ultra-fast IDE hard disk drive.
- Teac® 5.25" 1.2MB and 3.5" 1.44MB floppy drives.
- Diamond SpeedStar Hi-Color VGA graphics card with 1MB RAM and Sierra DAC. Over 32,000 colors.
- ZEOS 14" 1024 x 768 non-interlaced VGA color monitor.
- ZEOS/RS 101-key SpaceSaver keyboard.
- Two serial, one parallel and one game port.
- 6-16, 2-8 bit expansion slots; 80387SX math coprocessor support.
- Rugged ZEOS 7-bay SpaceSaver case with our 200 watt power supply and two cooling fans for added reliability and product life.
- Microsoft Mouse.
- MS-DOS 5.0 with QBasic.
- Microsoft Windows plus your choice of 2 out of 3 software applications: Ami Pro 2.0, Lotus 1-2-3 and/or Freelance Graphics!
- ZEOS 24-Hour-a-Day Toll-Free Technical Support and Customer Satisfaction Package.

Options Galore:

Including more memory, an incredible selection of hard drives (SCSI, IDE, ESDI, RLL or MFM) and virtually any other add-on you could want. Ask about other special money-saving packages too!

ORDER NOW TOLL FREE: 800-423-5891

Fax Orders: 612-633-1325
Government:

800-245-2449

GSA #GS00K91AGS517

Outside U.S. and Canada:
612-633-6131

MasterCard, VISA, Discover,
Am Ex, Z-CARD and COD
and Leasing Programs.
Open 24 Hours a Day,
365 Days a Year!



Apply Now for the Z•CARD!

NO ANNUAL FEE!

SEND FOR YOUR ZEOS CREDIT CARD



- **Low Consumer Rate!**
- **No Annual Fee!**

Now you can send for your own ZEOS Credit Card. It works just like a MasterCard or Visa for ZEOS purchases.

Fill out your Z•Card™ Application and mail it today to ZEOS International, Z•Card Processing Center, 530 5th Avenue N.W.,

St. Paul, MN 55112. We'll give you a call as soon

as your credit line is established!*

Please complete all appropriate sections, *providing at least two years residence and employment history*. **THIS IS NOT A CREDIT AGREEMENT!** One will be sent to you upon authorization of an account. (This Form Must Be Signed To Process Your Order.) All Financed Purchases Are Subject To Credit Approval. **If You Have Any Credit Questions, Please Call 800-421-8942 For Assistance. Thank You!**

A married person may apply for individual credit. I am applying for (please check appropriate box):

- ☐ **JOINT CREDIT** with another person. Complete entire application.
- ☐ **INDIVIDUAL CREDIT** but rely on income or assets of another person as a basis for repaying the credit requested. Complete entire application.
- ☐ **INDIVIDUAL CREDIT.** Do not complete Section C.**

**If you are a married Wisconsin applicant, you must provide your spouse's information as indicated, even though your spouse may not be signing the contract.

NOTICE TO WISCONSIN APPLICANTS: YOU MUST DISCLOSE YOUR MARITAL STATUS:

☐ married ☐ unmarried ☐ legally separated

A. YOUR PERSONAL INFORMATION

Name _____

Home Phone (_____) _____

Soc. Sec. No. _____ Date of Birth ____/____/____

Address _____ Apt. _____

City _____ State _____ Zip _____

Since? (Mo./Yr.) _____ ☐ Buy ☐ Rent ☐ Other _____

Previous Address _____

City _____ State _____ Zip _____

Employer _____ Since? (Mo./Yr.) _____

Monthly Gross Salary \$ _____ Daytime Bus. Phone (_____) _____

Previous Employer _____ From - To _____

Occupation _____

Income from alimony, child support or separate maintenance payments need not be disclosed if you do not wish to have it considered as basis for repaying this obligation.

Additional Monthly Income \$ _____ Source: _____

Name & Address of Nearest Relative Not Living With You _____

Relationship _____

B. CREDIT INFORMATION

PLEASE TELL US IF YOU HAVE: Checking Account ☐ Yes ☐ No Savings Account ☐ Yes ☐ No

	Y/N	How Many?		Y/N	How Many?
Bank Loan	_____	_____	Dept. Store Charge Card	_____	_____
VISA	_____	_____	Credit Union Account	_____	_____
MasterCard	_____	_____	Other Major Charge Cards	_____	_____
Finance Company Loan	_____	_____			

C. JOINT APPLICANT INFORMATION

Joint Applicant's Name _____

Soc. Sec. No. _____ Date of Birth ____/____/____

Address _____ Apt. _____

City _____ State _____ Zip _____

Home Phone (_____) _____ Date of Residence (Mo./Yr.) _____

Joint Applicant's Employer _____ Since? (Mo./Yr.) _____

Bus. Phone (_____) _____ Monthly Gross Salary \$ _____

CUSTOMER AUTHORIZATION

I authorize ZEOS International, Ltd. or its assignees to investigate credit records and to report my performance hereunder to credit agencies. I hereby certify that the following information is furnished to you for the purpose of obtaining credit and is true and correct to the best of my knowledge and belief.

Joint Applicant's Signature _____

Date _____

FOR MARRIED WISCONSIN APPLICANTS:
I acknowledge that the obligation described herein is being incurred in the interest of my marriage or family.

Applicant's Signature _____

Date _____

Buyer's Signature _____ Date _____

There are costs associated with the use of this credit card. To obtain more information about these costs, call us at 800-421-8942 or 612-635-0613 or write to ZEOS, Z•Card Processing Center, 530 5th Avenue N.W., St. Paul, MN 55112.

NY—A consumer credit report may be requested in connection with this application or in connection with updates, renewals or extensions of any credit granted as a result of this application. If I subsequently ask for this information, I will be informed whether or not such a report was requested and, if so, the name and address of the agency that furnished the report.

OH—THE OHIO LAWS AGAINST DISCRIMINATION REQUIRE THAT ALL CREDITORS MAKE CREDIT EQUALLY AVAILABLE TO ALL CREDITWORTHY CUSTOMERS AND THAT CREDIT REPORTING AGENCIES MAINTAIN SEPARATE CREDIT HISTORIES ON EACH INDIVIDUAL UPON REQUEST. THE OHIO CIVIL RIGHTS COMMISSION ADMINISTERS COMPLIANCE WITH THIS LAW.

*Financing not available in Alaska, Hawaii or outside the continental U.S.

John C. Dvorak



The Software Piracy Bluff

It's hard to get excited over revenues lost to software piracy when the industry is making \$10 billion a year.

People still copy software, and most of us who work for a living have little sympathy for the plight of the software vendor. After all, the software industry will eventually generate more millionaires than any other business in history. Bill Gates, with a net worth of \$7 billion, is now the richest man in America, and his money was accumulated from scratch—zero—in 15 years flat. Meanwhile, the watchdog Software Publishers Association (SPA) and the Business Software Alliance (BSA) claim that whatever the software industry sells, it loses at least 50 percent to pirates. They keep changing the number, but they like to say that

if it's a \$10-billion-a-year industry, then another \$10 billion goes to pirates. In other words, Bill Gates should be worth *twice* as much!

Let's examine Gates's net worth. If you made \$5 million dollars a year (and few people do) and put it under your bed, it would take you 1,400 years to achieve Gates's current net worth. Here's another cute calculation: Forget about interest. If you lived to be 70, to achieve Bill Gates's current net worth you'd have to make \$100 million (that's got eight 0s in it!) each year from the day you were born until the day you died.

At Microsoft there are something like 100 millionaires (maybe more). It's easy to go on and on about this. Suffice it to say that the public is not too thrilled with overnight millionaires (or billionaires) who are whining that they aren't making enough money because pirates are ripping them off. To expect a sympathy vote from the public is ludicrous. When you consider the wealth of a Bill Gates, and how impossible it is to achieve such wealth, you have to wonder who's ripping off whom. While software serves a useful robotic function, does it have to cost so much? No way.

Meanwhile, in a never-ending attempt to coerce the world into paying more money for software than is practical, the BSA is now attacking Germany. According to a news report: "In a submission to the US Trade Representative regarding allegedly inadequate copy-right protection, the Business Software

Alliance says Germany leads its list of countries causing the world software industry's greatest revenue loss from piracy. . . . [With] 1990 losses of \$1.86 billion, the BSA recommended Germany be placed on the Priority Watch List by the International Intellectual Property Alliance. (The IIPA represents the copyright industries of software, motion pictures, music, and books.) The BSA said next in line for concern are Italy and Taiwan, where it estimates total piracy losses in 1990 at \$754 million and \$753 million, respectively."

The question on my mind is: How were these enormous figures for piracy—\$3.37 billion—calculated? Out of thin air, that's how. You guess how many illegal copies might be made per unit sold and then multiply that number by the total legitimate sales in the country.

If copy protection were perfect, would the extra monies be realized? Unlikely. The fact is that most users, instead of buying software that they earlier copied, would use inexpensive shareware or bargain replacements. In fact, the software industry would probably be sunk if piracy were eliminated. Prices would fall rapidly as market share was gained by the cheap alternatives until they dominated the software market altogether. These piracy loss figures are as bogus as a \$3 bill, and the software industry knows it.



ILLUSTRATION MICHAEL KLEIN

The message that needs to be sent to the software industry can only be sent by the users of bootleg software. Go legit and buy those inexpensive shareware and public-domain alternatives. The industry will stop whining about lost revenues from piracy when we refuse to play its game. ■

CORELDRAW CD-ROM PACK

1

CorelDRAW 2.01 on CD-ROM

CorelDRAW is the world's finest graphics package! To date it has won over 50 international awards for its incredible type control, superb drawing power, stunning special effects, and ease of use. Creating eye-catching newsletters, advertisements, presentations and illustrations is fast and fun with CorelDRAW. Our users love it!

- **Over 10,000 clipart images and symbols:** included from the libraries of the leading clipart companies in the industry. This clipart is uncompressed so that it can load up to 10 times faster than the diskette version.
- **Over 200 fonts:** with incredible type control!
- **Easy installation:** the entire program can run directly from CD-ROM, saving valuable space on your hard drive.
- **Multilingual:** 5 languages included on one disk: English, German, Dutch, French and Spanish.
- **Multiplatform:** both Windows and OS/2 versions.
- **Hotline:** free demo program and unlimited hotline support.
- **On-line Help:** comprehensive documentation built into the program.



BONUS!

CD-AUDIO

- play your favorite music CDs from your computer.



LIBRARY OF THE FUTURE

- 450 titles literature, philosophy, drama, poetry, science and religion.



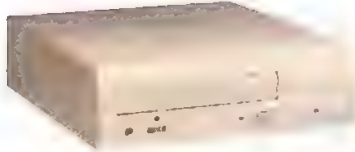
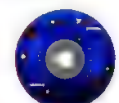
TALES OF MYSTERY

- 501 classic tales of horror, mystery and the fantastic.



ARTSHOW

- Over 1000 images from the CorelDRAW World Design Contest
- 1000 historical art images
- 120 page full color coffee table book!



2

High Performance CD-ROM Drive

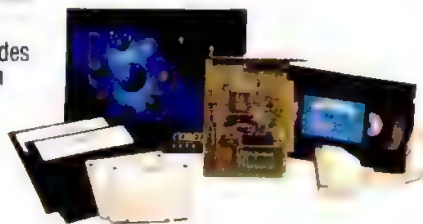
The Blockbuster Bundle is complete with one of the **fastest** multimedia CD-ROM drives, available in internal or external versions. Key features include embedded SCSI interface, head-phone output jacks, and adjustable volume control. And you can play all your favorite music CDs with the bonus CD-Audio software.

3

CorelSCSI Interface Kit

CorelSCSI provides a **fast and easy** connection to your PC allowing up to 7 peripherals on the same card. And it includes software drivers so you are ready for **future expansion** with other peripherals. It includes:

- CorelSCSI 8 bit host adapter and cable.
- CorelDRIVER software for CD-ROM drives, tape drives and hard drives.
- Videotape guide for easy installation.



OVER \$5,000 IN VALUE

\$1295

Complete upgrade offer for all registered users of:

- CorelDRAW
- Adobe Illustrator for Windows
- Aldus Freehand for Windows
- Arts & Letters Graphics Editor
- Gem Artline
- Harvard Draw
- Micrografix Designer

\$595



* \$1295 Internal version
\$1395 External version
\$1395 Micro Channel version

1-800-836-DRAW

CANADIAN TEL: 1-613-728-8200

24 HOUR FAX LINE: 1-613-761-9176

MASTERCARD • VISA • AMERICAN EXPRESS

CIRCLE 011 ON READER SERVICE CARD

COREL
1-800-836-3729

Inside Track

I've been fascinated by the comments made earlier this year by Intel Corp.'s top man, Andrew Grove. He told analysts in New York that he expects Intel to ship more than **30 new variations** of its 486 and 386 microprocessors this year. This **flooding of the market** seems to be part of Intel's strategy to **blow away** the competition with variety. The irony to this may be a replay of the **486SX fiasco**. As you know, the 486SX is a 486 with a perfectly good floating-point processor disabled. Intel wastes good silicon and manufacturing time on this processor, and guess what happens? The anticipated demand for the SX just isn't there, while **486 demand exceeds supply** because 486 chips were diverted to become 486SX chips.

It's hard to imagine what all of these variations are, but there's talk of Intel's experimenting with a 486 with a **clock tripler** or quadrupler. The new speed-doubled OverDrive chips should be an instant success, so why stop there? **Let's really crank** one of these babies up.

Windows NT Alert.: Bill Gates has indicated that Windows NT is going to be, if nothing else, a Unix killer(!!!!!!!). Some observers say that it is **a form of Unix**. Gadzooks! We do know that it uses an architecture based on what is called a micro-kernel. It's done, I'm told, in the same way as the OS for the Steve Jobs NeXT machine. Can Gates be following the lead of his **archenemy** Steve Jobs? The advantage: Micro-kernel architecture makes the operating system extensible and makes it possible to create some **futuristic** distributed OS. Somehow this all relates to Gates's **overblown** "Information at Your Fingertips" concept. Sounds too ambitious, if you ask me.

Scandal or Good Business Dept.?: John Morgan sends me this memo: "It seems someone got a 'new' package of software from none less than our dear friends at CompUSA which had a broken seal on the disk package inside. Their stores have shrink-wrap machines to repack 'shelf-weary' software, but the local store was repackaging software that had been returned under their 14-day no-questions-asked product satisfaction warranty. Their merchandising head back in Texas claims that is against store policy, that any returned software must go back to the manufacturer. So I read this, and file it in my brain. Five days later I return from a visit to CompUSA with a copy of Sidekick 2 for a client. Well, the software gets opened, and lo and behold, **no disk packaging** . . . and an old shrink wrap, price tag included, stuffed into the box. Tough to explain to client . . . to say nothing of the virus risk. . . I'm afraid the scandal will

revive copy protection."

I talked to the folks at CompUSA, and they are **adamant** that it's against company

policy. I've talked to other dealers about this, and they **all say the same thing**. But the tune changes once you get them off the record. Many software stores and record stores and other retailers stuck with returnable shrink-wrapped merchandise will repackage the item rather than go through the **trouble and expense** of returning an opened box for an ex-

change. Despite the potential for viruses, it's an expeditious practice that cannot be avoided. Perhaps at some level it is a scandal. I just can't get worked up about it—yet.

When Will It End Dept.?: A group at North Carolina State University has designed a 250-MHz microprocessor using fat old 2-micron technology. The group used a timing technique called **wave pipelining**, resulting in speeds **eight times** as fast as conventional CMOS. Apparently any old-fashioned chip designs can be sped up by a factor of eight using the new techniques. Sounds good to me!

The Beat Goes On Dept.: True story. I sent a researcher out to some computer stores **posing as a secretary** looking to buy a modem for her boss. She acted as though she **knew nothing** about computers. I've compiled her experiences for a

new book project. One incident was so humorous that I have to recount it here: "I spoke to a salesman named Timothy. I told him my boss had an IBM but I didn't know what kind it was. He gave me two photocopied sheets listing different IBMs and asked if any of them looked familiar. I said no. Timothy said I should buy a Hayes Smartmodem 2400 Plus. He said the 2400 Plus is packaged with cables and a program and is a very good bargain at \$149.00. I said I really didn't know if that was what my boss wanted, and Timothy began a high-pressure sales pitch.

"I asked Timothy what the difference was between a 2,400- and a 9,600-baud modem. **Timothy said a 9,600-baud modem was bigger** and a lot more expensive. That was the only difference. The lowest-priced 9,600 modem the store had cost \$499.00. I told Timothy I had to talk to my boss before I bought the Hayes 2400 Plus. I moved toward the door and Larry, another salesperson, stopped me.

"Larry said I should find out what my boss wanted to do with a modem. He said there were different modems for different needs. Then he said before I bought a modem I should find out the exact kind of IBM my boss owned."

It never ends!

■

Introducing QuickBooks, from the makers of Quicken. The first software that does your books while you conduct your business. All you do is pay bills, invoice clients, and collect deposits. QuickBooks does all the work to provide you with management information and financial statements – any time you want.



But now you can computerize your books without any accounting mumbo-jumbo.

 If you want to invoice a customer, choose "Invoicing." It's that simple.



Totals how much you owe.

[illegible]

Powerful bookkeeping, easier than you ever imagined possible.

Collect money faster than ever.

All the information you need to call customers.

Quickly see who's behind.

A/R Aging

Customer	Due	Days	Amount
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00
Mr. John Smith	10/15/92	15	1,000.00

Collection Report

As of: 10/31/92

Customer	Invoice	Amount	Due	Balance Due
Mr. John Smith	1001	10/25/92	10/27/92	1,000.00
Mr. John Smith	1002	10/25/92	10/27/92	1,000.00
Mr. John Smith	1003	10/25/92	10/27/92	1,000.00
Mr. John Smith	1004	10/25/92	10/27/92	1,000.00
Mr. John Smith	1005	10/25/92	10/27/92	1,000.00
Mr. John Smith	1006	10/25/92	10/27/92	1,000.00
Mr. John Smith	1007	10/25/92	10/27/92	1,000.00
Mr. John Smith	1008	10/25/92	10/27/92	1,000.00
Mr. John Smith	1009	10/25/92	10/27/92	1,000.00
Mr. John Smith	1010	10/25/92	10/27/92	1,000.00

QuickBooks proven 12 times easier than leading products.

An independent research firm had small business bookkeepers perform 11 of the most common bookkeeping tasks using

QuickBooks, DacEasy, and Pacioli. People using QuickBooks were able to complete all 11 tasks 12 times more often than people using DacEasy. No one using Pacioli was able to complete all of the tasks.

QuickBooks DacEasy Pacioli
Source: Merrill Research & Associates

Complete financial picture of your business.

Get control over your bottom line.

Evaluate your financial resources.

See emerging sales trends.

Predict your cash needs.

Complete Financial Reports

- Profit and loss statement
- Sales report
- Accounts receivable aging
- Collections report
- Accounts payable aging
- Sales tax report
- 1099 report
- Cash flow forecast
- Payroll report
- Budget report
- Other reports
 - Summary report
 - Transaction report
 - Itemized income and expenses
 - Project or Job report

Profit & Loss

QuickBooks

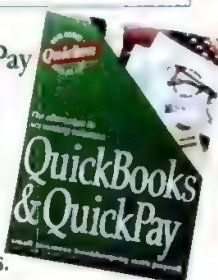
Balance Sheet

Sales Report

Cash Flow Forecast

Works with QuickPay for payroll.

With QuickPay, QuickBooks calculates all deductions, prints payroll checks and keeps complete records.



Complements Quicken perfectly. QuickBooks works and navigates just like Quicken, and reads Quicken files during set-up.

Limited time introductory offers!

Quicken owners: buy QuickBooks from Intuit for just \$54.95 (\$85.00 off \$139.95 SRP). Or find your best retail price and cash the coupon inside the box for a **\$30.00 rebate!** And, you can buy QuickPay from Intuit for \$29.95 (\$30.00 off \$59.00 SRP).

Current QuickPay users: please call for a free QuickBooks compatibility disk.

Everyone else: we still have a special deal for you! For a limited time, you can buy QuickBooks from Intuit for just \$99.95 (\$40.00 off \$139.95 SRP).

Full 60 day money back guarantee. Rebate offer valid through retail stores. All offers expire June 30, 1992.

To order, call toll-free

1-800-624-8742

24 hours a day, 7 days a week, U.S. and Canada

Intuit

P.O. Box 3014, Menlo Park, CA 94026

© Intuit 1992

Ad Code: PA5TB

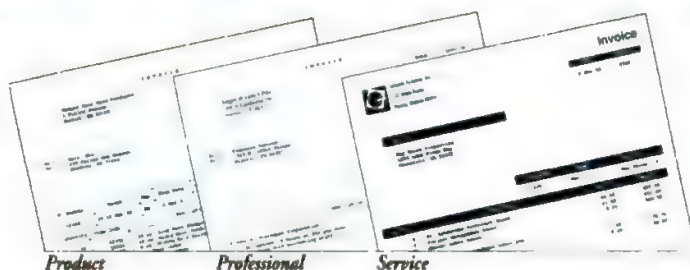
Flexible invoice printing – 3 invoice formats.

Printing options:

- Your letterhead
- Plain paper
- Pre-printed form

Invoice formats:

- Product
- Professional
- Service



HERE...

THERE...

AND EVERYWHERE.

Announcing **MultiExpress™**, the New Communications Software Package From Multi-Tech Systems

Here, There, and Everywhere.

MultiExpress works from **HERE**, allowing you to use your modem to dial into information services, BBSs or corporate mainframes.

MultiExpress works from **THERE**, giving you remote control of another computer, such as the one at work when you're home.

MultiExpress works from **EVERYWHERE**, allowing LAN gateway access for both in-bound and out-bound communications.

Instead of buying several different comm packages for your local, remote and LAN applications, get one...MultiExpress!

Call us at 1-800-328-9717 for more detailed information on our software, as well as our modems, multiplexers and LAN gateways.

Introductory Offer: Two Ways To Get It.

Easy way: Buy it at the special introductory price of \$195.*

Easier way: During the introductory period,* MultiExpress is included free with any Multi-Tech **MultiModem™** 2400, 9600 or 14,400 bps modem.

MultiTech®
Systems

The right answer every time.

Multi-Tech Systems, Inc., 2205 Woodale Drive
Mounds View, Minnesota 55112 U.S.A.
(612) 785-3500, (800) 328-9717, U.S. FAX (612) 785-9874
International Telex 4998372, International FAX (612) 331-3180

MultiExpress, MultiModem and MultiTech are trademarks of Multi-Tech Systems, Inc.

*1/1/92 through 6/30/92
Copyright © 1991 by Multi-Tech Systems, Inc.

CIRCLE 108 ON READER SERVICE CARD

Jim Seymour



LAN Licenses: It's Not Black And White

Applications in the background of the Windows desktop wreak havoc on the concurrent licensing of today's networked software.

The two columns I wrote back in December on the problems in LAN software pricing have brought a steady stream of letters from corporate network managers, bemoaning the erratic and sometimes whimsical pricing schemes of software vendors.

Many tell conventional tales of woe: silly licenses apparently designed more to keep users away and restrict the proliferation of network applications within a company than to promote the widespread use of the programs. Others recount the intransigence of major PC software vendors when confronted by these managers—their most important customers, in

many cases—with proposals for better approaches. The old “NIH Syndrome,” rejecting ideas because they were Not Invented Here, is alive and well in the PC software business. Even those software-industry executives who ac-

knowledge that their companies' policies serve neither the interest of their customers nor their own rational self-interest show little inclination to change.

“We do it that way because we do it that way” is an all-too-common response.

Other letters delve into some of the subtle issues raised by the boom in networks and by changes in how we see and use software. One of the best comes from Bob Moskowitz, an MIS planner at a major U.S. automobile manufacturer. Bob's an old friend who often helps me understand how corporations really want to buy, distribute, and use PC software.

His current cause is the problem of licensing software for networked graphical-user-interface environments. This is a wonderful example of the treacherous little twists and turns buried away in software pricing—especially when vendors continue to think about pricing strategies in terms of how we used to use our computers. It's also a good example of how straightforward software licensing could make everyone's life easier.

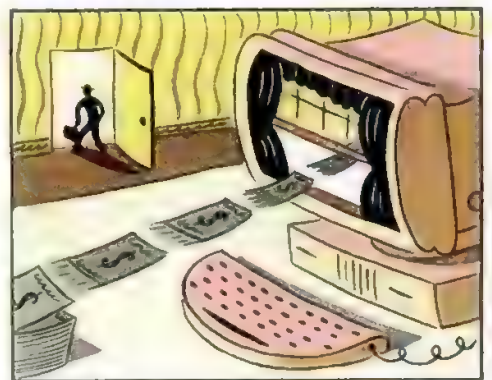
Bob points out that concurrent licensing

made a lot more sense in the character-oriented world than in the Windows era. Huh? What does the user interface have to do with LAN software licensing?

Simple: In a Windows environment, many users want to have all the applications they commonly use open on their desktops all the time. By reducing those not in use to icons, they can quickly context-switch among applications—jumping, say, from *WordPerfect* to *Microsoft Excel* to *Paradox*.

That takes a lot of RAM—and, at least until Windows 3.1, a lot of courage in the face of possible Unrecoverable Application Errors. But RAM is cheap: PCs with 8MB to 12MB of memory are not uncommon in companies that have made commitments to LANs and Windows. And the combination of Win 3.1 and second-generation Windows applications seems to have ironed out most of the UAE problems.

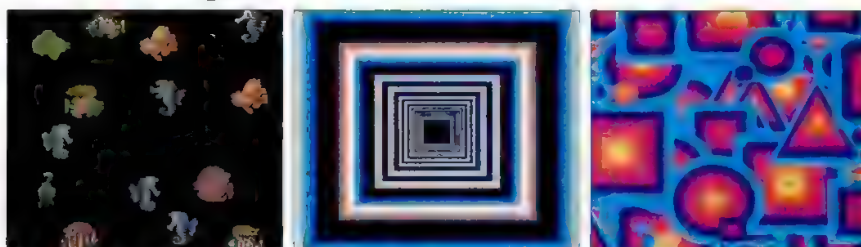
Having all the applications you use lying open on your screen's “desktop” plays havoc with concurrent licensing. Say you have a workgroup of 30 people on a LAN. You buy a network license for up to 10 concurrent users of *WordPerfect*. That's fine: You're unlikely to ever have more than 10 concurrent users of *WordPerfect*.



But now put Windows on those PCs along with enough memory to run it reasonably. Show people how to define program sets that open automatically when they turn their PCs on—or that simply stay in memory all the time, since those networked PCs are no longer turned off at night.

Now your network software counter mech-

IT'S THE BACON, EGGS, HASH BROWNS, COFFEE, BUTTER, AND JELLY OF SCREEN SAVERS.



If you just want an order of flying toast, another popular screen saver will suffice. But ordering Intermission™ gives you everything else.

Along with full password protection, network support, site licensing, and 56 dazzle-my-pupils-and-knock-me-out graphics modules, you'll get options to personalize displays, monitor CPU activity, and change wallpaper. Games are included and there's a quick sleep feature should the boss catch you playing.

If you're a hungry Windows™ user, call in an order on behalf of your screen and your psyche to 1-800-877-4266.

Intermission

WINDOWS USERS DESERVE A BETTER BREAK.

ICOM

© 1992 ICOM Simulations, Inc. 648 South Wheeling Rd. Wheeling, IL 60090. (708) 520-4440. All Rights Reserved. Intermission is a trademark of ICOM Simulations, Inc. All other trademarks are property of their owners.

CIRCLE 044 ON READER SERVICE CARD

There's A New Tris On The Block.

If you love TETRIS, you'll be obsessed with WORDTRIS™! In this new Soviet challenge, the falling pieces are letter blocks, and instead of just forming lines, you make words.

Every time a word is formed either vertically or horizontally, it disappears. The more words you make, and the more complex the words, the more points you earn. A built-in 60,000 word dictionary checks even the most obscure word.

But the real challenge builds as the levels go higher and the letters fall faster and faster.

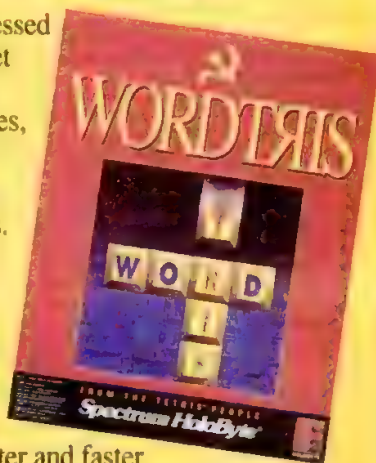
WORDTRIS. Let the alphabetical adrenalin flow!

FROM THE TETRIS™ PEOPLE
Spectrum HoloByte

A Division of Sphere, Inc., 2061 Challenger Drive, Alameda, CA 94501

Available for Mac Mac II and IBM

Available in retail stores or for Visa/MasterCard orders call toll free, 24 hours a day, 7 days a week 1-800-695-GAME (Orders Only)
For technical questions and system requirements call: 1-510-522-1164 (M-F 9am-5pm PST)



CIRCLE 178 ON READER SERVICE CARD

Jim Seymour

anism on the server goes crazy. While you might have no more than 10 people using *WordPerfect* at a time—if we define *using* rationally, to mean actually working in the program with a data file—it looks to the counter as if there are 30 copies of *WordPerfect* checked out. Or there would be, if the counter allowed.

The obvious way around this is to trigger that counter only when the user actually loads a file under his workstation's copy of *WordPerfect*. In other words, it would not be the process of loading *WordPerfect* into memory that increments the counter by one, but the process of using that copy to work with a file.

Bob points out that implementing such a system under most of today's products would be difficult. This is not the case in an "object-enabled" environment, however. In an object-enabled setting, using an object-aware application, it would be easy. We have two choices today in this realm: Windows 3.1's OLE and OS/2 2.0's Workplace Shell. OS/2 has actually leaped ahead here (*Did you hear that, Zachmann? I'm admitting there's something good about OS/2...*), but Windows NT will catch up—and maybe leapfrog ahead, with its Windows Advanced Services later this year.

A final issue is what happens when a user is working in an object-aware version of *WordPerfect*, gets a call on the phone, then runs down the hall to the boss's office for a meeting that winds up taking 3 hours. Is his copy of *WordPerfect* tied up for all that unused time? Shouldn't a truly smart counter detect that inactivity and, after a specified time, save the work in progress in a .TMP file and close that copy of *WordPerfect*? You bet.

I wish I could tell you that I've had lots of stimulating discussions with software vendors over building that kind of intelligence into their LAN licensing. Sad to say, I haven't. When I ask software execs about the notion, I get answers like "Hmmm. Interesting idea. But..."

If vendors want customers to adopt their programs for enterprise-wide use, we need a new form of software licensing. It will be a cross between the impossibly expensive one-license-per-user system and today's dumb concurrent-user licenses.

We've got all this snazzy computer technology available. Let's start using it, vendors.

The CallSoft Value:

- Same Day Shipping • Knowledgeable Staff
- No Extra Surcharge on Visa, M/C
- Corporate P.O., A.P.O., F.P.O. and International Orders Welcome

CallSoft

Estd Since 1982

TO ORDER CALL **1-800-777-5000**

Software and Peripherals at Best Prices and Full Service

INTERNATIONAL CALLERS USE
1-908-805-0995
 (Mon-Fri 8:00AM - 8:00PM EST)
OVER 10 DISTRIBUTION CENTERS NATIONWIDE



Smart Suite -
 Smart Suite from Lotus is four full-featured, powerful business applications 1-2-3 for Windows

spreadsheet, Ami Pro word processor, Freelance Graphics presentation graphics package and cc Mail electronic mail

\$449



Skylight DBMS for Windows -
 Magazine says "it is simpler than Superbase, more visual than dBase and more powerful than Acefile"

Finally, a 'user friendly' database that requires no programming.

\$149



Microsoft Excel 4.0 for Windows -
 The leading spreadsheet for the Windows environment just got even better. Microsoft Excel version 4.0 for Windows was designed with you in mind. It gives you access to more powerful features and makes everyday spreadsheet tasks easier than you ever dreamed possible. Microsoft Excel version 4.0 works the way you do and provides you with the tools you need

\$299

Microsoft Excel 4.0 for Windows - The leading spreadsheet for the Windows environment just got even better. Microsoft Excel version 4.0 for Windows was designed with you in mind. It gives you access to more powerful features and makes everyday spreadsheet tasks easier than you ever dreamed possible. Microsoft Excel version 4.0 works the way you do and provides you with the tools you need



Word's Tech ARAGO dBase -
 ARAGO dBase is a fully dBase IV compatible database management system with unmatched performance and ease of use

\$359



Word's Tech ARAGO dBase - ARAGO dBase is a fully dBase IV compatible database management system with unmatched performance and ease of use

AmiPro and 1.2.3 for Windows Upgrade	149
AmiPro v2.0 Upgrade (special price)	89
Microsoft Word for Windows v2.0	290
Microsoft Word v5.5 w/ Grammar	204
Spinnaker PFS Write Plus for Windows	163
Reference Grammar IV DOS or Win	54
Que Soft Rightwriter 5 for Windows	69
Word for Word Pro	79
WordPerfect v5.1	249
WordWriter Pro [new]	59
3M DC 2120 Data Cartridge	21
Fardian Phonenet Connector	29
Keytronic KB 101 Keyboard	99
Logitech PS/2 Mouse	69
Microsoft Bus Mouse	82
Microsoft Serial Mouse	82
Microsoft Serial Mouse w/Windows	139

3 Cometherlink II	185
Artisoft LANtastic AE 2 Ethernet Adapter	189
Eagle Tech N.E. 1000 Ethernet card	129
Eagle Tech N.E. 2000 Ethernet card	149
Stand MicroSys Ethernetcard Plus Elite 16T	129

Dove Fax/Modem for Windows	199
Everex Evercom 24	199
Hayes Smart Modem 2400	259
Intel: Satisfaction Classic	359
Practical Peripherals 2400 1/2 Card	79
Practical Peripherals 9600SA	389
Practical Peripherals Pocket 2400 modem	105
Telem. Telephonics NIK 2400R	69
Telem. Telephonics Smart Modem 2400B	119

Goldstar Tech 1430 Plus 14" VGA	299
Mitsubishi XC 1429 14" VGA Color Mon	359
NEC Multi Sync 2A	379
NEC Multi Sync 3FGX Flat Screen	649
Panasonic Pansync C 1381 14"	329
Samsung Info 14" VGA Color Monitor	289
Samsung Info MA 2565 12" Mono	59
Wyse Tech. 60 14" Terminal	289

3M 3.5" DSHD Formatted Media 10 Pak	16
Colorado Mem Systems Jumbo 120 mb	269
Colorado Mem Systems Jumbo 120 mb	189
Conner 3000 42 mb 3.5 IDE Drive	179
Invin Magenta: Ext 40 120 mb	229
Mountain FS 4440 40 120 mb	249
Toshiba 3.5" 1.44 mb Floppy Disk Drive	58

Cannon BJ 10e Ink Jet Printer	319
Cannon BJ 300 Ink Jet Printer	425
HP Laser Jet Desk Jet IID	1499
HP Laser Jet II w/Toner	859
Okidata ML 320 Printer	309
Okidata ML 380 Printer	230
Okidata OL 400 Printer	599
Okidata OL 830 Printer	1279
Okidata OL 640 Printer	1559
Panasonic KX P1123i	219
Panasonic KX P1124i	299
Panasonic KX P1180i	179
Seiko Personal Colorjet PS Printer 4meg	4799
Sharp Laser Printer 4 PPM 300 DP	995
Sharp X320 Color Scanner w/Image	1699

WIN a Sharp PC 6430 LAPTOP !!
 Every time you order you are entered into our July 7th Drawing!

Sharp Notebook PC 6430 Computer	1699
20MHz 386 SX 2 meg ram 40 meg hd 10" paper white LCD 4.5 lbs w/battery includes MS DOS and Laplink Software	
AST Exec 386SX 20/60 Notebook	2109
AST Exec 386SX 25/ 4 60 hd	2450
AST Exec 386SX 25/ 4 80 hd color	3899
Everex Tempo .X 386 SX/20 3.40	1957
Texas I TM 3000 Win SX 20/80	2789
Texas I TM 3000 386 SX/20 2 60 hd	2189
Texas I TM 3000 386 SX/20 2 40 hd	1850
Toshiba 11000LE	999
Toshiba 12000/40mb	1579
Toshiba 12000SX 40mb	1879
Toshiba 12000SXK 40mb	2359
Toshiba 12000SXK 60mb	2599
Toshiba 12800SX 40mb	3109
Toshiba 12800SXK 80mb	3499
Toshiba 15200/200	3799
Toshiba 15200/200 Color	3899
Toshiba 14400SX/80 LCD	4300
Urbex 386SX 20 4 40 mb hd	1799
Urbex 386SX 20 4 60 mb hd	1999

Need a gift? Gift Certificates Available

Safari NSX/20. Because Leave Your Office Wh



Ready to use out of
the box

Battery life of
up to 6 hours

DOS Windows and
AT&T Mail loaded

se You Can't Afford To en You're On The Road.



"[Its] performance and user friendly hardware and software features make the Safari as close to perfection as you'll find today."
PC Laptop, December 91

Enhanced Mobile Communications through optional LAN adapter or integrated modem

Safari Gives You Everything You Need For Mobile Networking. So You Don't Have To Leave Your Office When You're On The Road.

Mobile Computing has become a way of life for people whose business takes them away from their office. But this has meant sacrificing connectivity for mobility, and portable PCs have fallen short of delivering the networking capabilities that business travelers need. Until now.

The Safari® NSX/20 Notebook Computer

is the first notebook PC designed specifically for mobile networking, while still providing portability, ease of use, and the power of an Intel386® SX processor to run almost any application. With a LAN adapter or an integrated modem, the NSX/20 gives you superior connectivity worldwide. And it takes advantage of Mobile Networked Computing, a new level of mobile computing combining

NCR's innovative portable technology with AT&T's worldwide connectivity, to let you network from anywhere in the world to anywhere in the world.

The NSX/20 also comes loaded with DOS/Windows® and all the software you need for cellular modem connectivity, and other communications facilities. Including AT&T's advanced EasyLink® services, which give you access to a variety of options such as global messaging, AT&T Mail and FAX features, and on-line information services.

Plus, the Safari NSX/20 Notebook Computer has superior VGA screen clarity, as well as a full-size keyboard with the look and feel you're used to in a PC. And it comes complete with a dual battery pack, which gives you up to 6 hours of uninterrupted power on the road.

Find out how NCR is putting it all together. Call

1 800 CALL-NCR for a free brochure or your nearest NCR reseller or representative. And bring your office with you next time you travel.

The Power of Portability

	Compaq TE 386s 20	Toshiba T2200SX	AST Premium EXEC 386SX 20	Qbit 3200+
2400 Modem:	Standard	Optional	Optional	Optional
9600 FAX:	Standard w/ ROMB	N.A.	N.A.	Optional
Software Included:	DOS Windows, QM Mail	None	DOS 4.01	DOS 3.3
Size:	9.5x12x1.8" 206 cu"	8.5x11x2.25" 155 cu"	9x11.4x2.25" 231 cu"	8.5x11x2" 187 cu"
Drives:	40 80MB	30 60MB	40 60MB	20 40 60MB
Battery Life:	5-6 hrs.	3 hrs.	3-4 hrs.	4-5 hrs.
Screen Size:	10" Triple ST	9" Single ST	9.5" Single ST	8.5" Single ST
Weight:	7.3 lbs.	7.5 lbs.	5.5 lbs.	6.4 lbs.

The Safari NSX/20 Notebook Computer gives you superior power and portability in a competitively priced notebook PC.



**Open, Cooperative Computing.
The Strategy For Managing Change.**

NCR is the name and mark of NCR Corporation. Safari and EasyLink are registered trademarks of AT&T. The Intel Inside Logo is a trademark and Intel386 is a registered trademark of Intel Corporation. Windows is a registered trademark of Microsoft Corporation. © 1992 NCR Corporation.

CIRCLE 242 ON READER SERVICE CARD



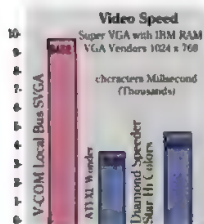
With features like 32-bit local bus and 142-key keyboard,

SPEED LIMIT

**32
bit**

Keeping pace with technology – this has always been our goal. As new innovations and new ideas arrive, V-COM is always the first to make them available to the consumer. Now we present to you the V-COM 486 Local Bus System—a ground-breaking product which has us very excited. • What is "local bus"? Well, put simply, it is an inexpensive way to take full advantage of your 486 CPU's 32-bit processing capability. You see, the 486 CPU was designed to communicate with the rest of the computer through a 32-bit bus. The problem is that a 486 ISA bus system can only accommodate 16-bit I/O cards (graphics cards, disk controller cards, LAN devices etc.). In these systems, the CPU still has 32-bit communication with the on-board RAM, but everything slows down when it is forced to send or receive information through a 16-bit ISA bus I/O device (such as when it needs to access information on a disk drive or send a video signal to the monitor). Until now, the only way to utilize the 486 CPU's full capability was to spend about an extra \$1,000 to buy an EISA bus system. Now with the V-COM 486 Local Bus System, you can get the speed and performance of EISA for about the price of an ISA system. What's

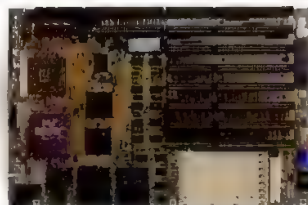
LANDMARK SPEED V. 2.00



more, our local bus system is fully upgradable, accommodating the full range of

486 CPU's, from 486SX-20 to 486DX-50. What does this all mean to you? At last you can enjoy the performance of full 32-bit operation without spending a lot of money. Windows and CAD/CAM users will be amazed at the increased speed which the local bus provides. Everyone will rejoice when they see how little this system costs. Now you can see why we are so excited about this product. To complement your high-performance 486 local bus system, we include a 32-bit local bus SVGA graphics

This device allows your monitor to display up to 32,768 colors and offers resolutions of up to 1280 x 1024. And if speed is what you need, this card's 32-bit bus allows it to operate 2.5 times faster than standard SVGA ISA cards currently available.



V-COM 486/33T \$3397

- 80486DX-33 Processor • Math Coprocessor
- 256K CACHE Memory • 16 MB RAM
- 1.2 MB 5.25" Drive • 1.44 MB 3.5" Drive
- Two 32 bit Local Bus Expansion Slots
- 2 Serial, 1 Parallel, 1 Game port
- 340 MB Hard disk • High-Resolution Mouse
- Color Non-Interlaced Super VGA Monitor
- Microsoft DOS 5.0 • Microsoft Windows 3.0
- 142 key programmable keyboard
- 32 Bit Local Bus SVGA Card Resolution up to 1280x1024 & up to 32,768 Colors.

V-COM 486/50T \$3997

- 80486DX-50 Processor • Math Coprocessor



V-COM 486/33C \$2097

- 80486DX-33 Processor • Math Coprocessor
- 64K CACHE Memory • 4 MB RAM
- 1.2 MB 5.25" Drive • 1.44 MB 3.5" Drive
- Two 32 bit Local Bus Expansion Slots
- 2 Serial, 1 Parallel, 1 Game port
- 120MB Hard disk • High-Resolution Mouse
- Color Non-Interlaced Super VGA Monitor
- Mini Tower Case with extra cooling fan
- Microsoft DOS 5.0 • Microsoft Windows 3.0
- 142 key programmable keyboard
- 32 Bit Local Bus SVGA Card Resolution up to 1280x1024 & up to 32,768 Colors.

V-COM 486/33CS \$2497

- 80486DX-33 Processor • Math Coprocessor
- 256K CACHE Memory • 8 MB RAM • 200MB Hard Disk

Get the options you desire at one low price! Just look at our systems included:

- Ergonomic quality case design
- One-year warranty
- 30-day money-back guarantee

- Replacement parts shipped second day air at no extra charge
- Lifetime toll-free technical support
- Credit card and C.O.D. orders accepted with NO SURCHARGE

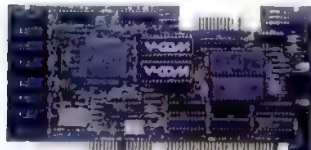
- Purchase orders accepted
- APO/FPO orders accepted
- Power package includes even more options!

All brand names are trademarks of their respective companies. Prices and specifications may be subject to change without notice. Please call to confirm price and specifications. All returns require RMA numbers and must be shipped in original condition prepaid and insured. Money back (excluding shipping charges) with 30 days upon receipt of merchandise with no restocking charge. Money back guarantee and part replacement apply only to V-COM Brain products. No refunds given for software or printers.



V-COM systems give you more for your money.

If you use Windows, CAD/CAM, or any other graphics intensive applications, you will appreciate the performance which this card delivers. • Your keyboard is the link between you and your computer. To help you work better with your computer, we give you a special 142-key keyboard. It comes complete with everything you would find on a standard 101 keyboard plus much more. For left-handed users, there is an extra set of twelve function keys down the left edge of the keyboard. In addition to this, there are 24 programmable function keys along the top of the keyboard. These can be programmed to perform a variety of tasks from entering often repeated text to carrying out complicated maneuvers, which may even include the use of your mouse. To make this all possible, this keyboard has its own microprocessor and 8 K cache memory built



right in. • Quality within, quality without. Every component that goes into a V-COM system meets the highest quality standards. This includes the cases we use. From our standard desktop to our mini-tower, to our full-sized tower case, all are attractively styled to compliment any home or office environment. But there's more to our cases than just good looks. They come



with an extra fan for improved ventilation. This helps to prolong the life of your computer. The outer shell of our tower cases are not painted, they are covered with a special PVC laminate which is more resistant to scratching and will not fade over time. At V-COM, we are always a head above the crowd. While other computer makers are content to sheepishly stay with the herd, V-COM breaks free to offer you more. Our philosophy is simple—just be better than everyone else. We use only the highest quality materials in our systems, we back up our systems with complete technical support, and we offer all this to you for the lowest possible price. Contact a V-COM representative today to find out more about what we can do for you.



V-COM 386 / 33C \$1697

- 80386DX-33 Processor
- 64K CACHE Memory • 4MB RAM
- 1.2 MB 5.25" Drive • 1.44MB 3.5" Drive
- 2 Serial, 1 Parallel, 1 Game port
- 120 MB Hard disk • High-Resolution Mouse
- Color Non-Interlaced Super VGA Monitor
- Mini Tower Case with extra cooling fan
- Microsoft DOS 5.0 • Microsoft Windows 3.0
- 142 key programmable keyboard
- High speed SVGA Card, Resolution up to 1280 x 1024 & up to 32,768 Colors.

V-COM 386 / 40C \$1717

- 80386DX-40 Processor



V-COM 386SX / 25 \$1397

- 80386SX-25 Processor
- 4MB RAM
- 1.2 MB 5.25" Drive • 1.44MB 3.5" Drive
- 2 Serial, 1 Parallel, 1 Game port
- 85 MB Hard disk • High-Resolution Mouse
- Color Non-Interlaced Super VGA Monitor
- Microsoft DOS 5.0 • Microsoft Windows 3.0
- 142 key programmable keyboard
- High speed SVGA Card, Resolution up to 1280x1024 & up to 32,768 Colors.

V-COM 386 / 25 \$1497

- 80386DX-25 Processor

1-800-875-8266

V-COM ENTERPRISES, INC.

1855 BUSINESS CENTER DRIVE DUARTE, CALIFORNIA 91010

TEL: (818) 357-7788 • FAX: (818) 301-9005

BUSINESS HOURS:

M-F 7:00AM-6:00PM

SAT 9:00AM-4:00PM

(Pacific Time)

CIRCLE 090 ON READER SERVICE CARD



V-COM KEEPING PACE WITH TECHNOLOGY.



A network in just a few minutes?
It's a cinch with Network Simplicity—the "no work" network from Xircom. A ready-to-use modular network solution, Network Simplicity™ combines Xircom's award-winning Pocket Ethernet Adapters with Novell's NetWare Lite to create the simplest network available.

Installing Network Simplicity couldn't be easier. Novell's entry-level NetWare Lite software, coupled with Xircom's Simplicity SetUp™ installation software, uses a simple question and answer format to guide you automatically to a fully-configured network. You don't have to be a network guru to get a fully usable network up and

Network Simplicity: The "no work" network.



The Network Simplicity Starter Pack is a complete network in a box, giving you everything you need to build a local area network using two of your PCs and a printer. And with convenient Network Simplicity Expander Packs and PPX Packs, you can easily add PCs and printers as your network needs grow.

running. Plus, your network users will be able to immediately send and receive messages via Simplicity E-Mail.

Network Simplicity—networking has never been easier! From Xircom and Novell. To find out more about Network Simplicity, call the Xircom Sales team at 1-800-874-7875.

Xircom
Networking has never been easier.

26025 Mureau Road
Calabasas, CA 91302
Tel (818) 878-7600
Fax (818) 878-7630

Bischoppenhoflaan 82-84
2100 Antwerp, Belgium
Tel (32) 3-326-34-94
Fax (32) 3-326-31-50

Xircom is a registered trademark of Xircom, Inc. Pocket Ethernet Adapter, Network Simplicity SetUp and Simplicity E-Mail are trademarks of Xircom, Inc. General Notice: Some of the product names herein have been used for identification purposes only and may be trademarks of their respective companies. ©1992 Xircom, Inc.

William F. Zachmann



Can OS/2's Shell Help Crack Its Market?

More Mac-like than the Mac itself, OS/2's desktop environment, the Workplace Shell, will be pivotal in making or breaking IBM's enhanced operating system.

It's "put up or shut up" time. Either OS/2 will effectively challenge Windows' claim as the sole heir to DOS, or else it will go the way of *TopView* and the *PCjr*, very possibly taking IBM Corp. down with it.

The new Workplace Shell (WPS) is one of the most controversial aspects of OS/2 2.0. It will be a key factor in determining whether OS/2 2.0 succeeds or fails. Was it a mistake for IBM to add this strange new desktop environment to OS/2 at the eleventh hour?

Not at all. On the contrary, the WPS is one of OS/2 2.0's key strengths. It will prove to be a great competitive advantage.

The WPS first appeared with the 6.167 beta release of OS/2 2.0 distributed last October. Unlike the previous release (6.149), which was rock solid, 6.167 had some rough edges. It was unstable and incomplete, and broke some things that had worked in the previous version.

The WPS was also initially disconcerting, at least

to some OS/2 supporters who were already accustomed to the OS/2 Presentation Manager interface. The combination of the new object-oriented paradigm of the WPS with the instability of the 6.167 beta led some to believe that OS/2 2.0 would have been better off without the WPS.

The problems with 6.167, however, were transitional and were solved. Furthermore, nearly everyone who tries the WPS finds that the more they use it, the more they like it. That's not at all surprising, since the WPS, which borrows the Mac's file-folder approach, is far more powerful and easier to use than the Windows-like interface of OS/2 1.x's Presentation Manager. Like the Macintosh, the WPS presents data files, programs, devices, and folders as objects to be manipulated directly by the user. It goes beyond the Mac by providing features such as "menus on demand" via the right mouse button. In addition, the WPS's drag-and-drop capabilities insulate users from hierarchical file structures. And its entertainment and productivity accessories go beyond Windows' accessories.

The Mac-like qualities explain why IBM held up even the internal distribution of OS/2 2.0 betas that included the WPS until after IBM had concluded its extensive development and cross-licensing agreements with Apple last September. The WPS goes much deeper into Apple's claimed intellectual property rights territory than Microsoft Windows does—and Apple is suing Microsoft.

Windows brought some of the capabilities of the Macintosh to IBM and compatible systems, but it has always fallen well short of the Mac in being easy to learn and use. The WPS equals and arguably exceeds what the Mac has to offer in this respect.

Were OS/2 aimed only at high-end workstations and servers, no one would care. OS/2 2.0, however, is meant to be a standard desktop operating system in the home as well as in the office, which makes the Mac-like accessibility of the WPS very important.

The WPS offers an attractive desktop GUI for the more than 90 percent of DOS users who still don't use Windows. It offers an easy entrée to people who aren't using computers at all. It offers a more powerful GUI paradigm for Windows users. After you've used the WPS, even the improved interface of Windows 3.1 seems clunky and boring by comparison.

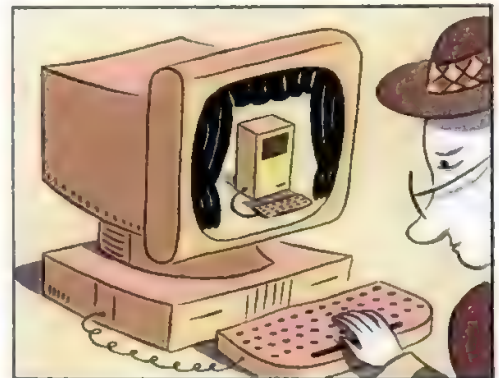
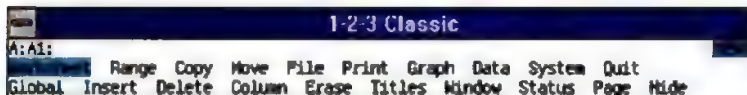
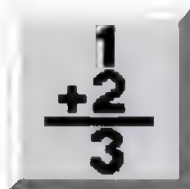


ILLUSTRATION: MICHAEL KLEIN

IBM took a bold step by building the WPS into OS/2 2.0. That gamble is likely to pay off. It will help to make OS/2 2.0 attractive to users who are uncomfortable both with the DOS command line and with Microsoft Windows. It will finally make IBM and compatible systems "as good as the Macintosh" and as easy for nontechnical people to use. ■

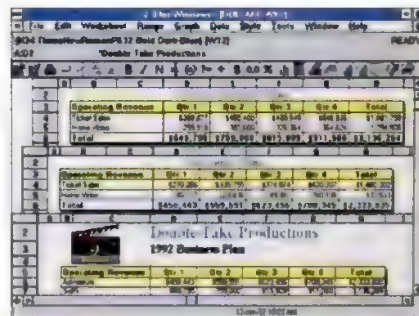


▲ The 1-2-3 Classic® menu helps make the move from DOS to Windows a smooth one. Press the slash key and the familiar 1-2-3 menu appears, fully functional, on screen.



▲ Click here to add up columns and rows. Even if the totals are separated by blanks or dotted lines.

True 3D capabilities let you consolidate related spreadsheets into one file without the need for file-linking.



With the new 1-2-3 for Windows Release 1.1, you'll find noticeable improvements in its overall performance. Including faster screen display and printing. As well as support for Windows 3.1.



▲ 1-2-3 for Windows is fully compatible with all earlier versions of 1-2-3. And it's fully integrated with our other Windows products, so you can move and share data among them without missing a beat.



Some little about a well-kno

Introducing 1-2-3 for Windows Release 1.1.

Most people recognize Lotus® 1-2-3® as The World's Most Popular Spreadsheet™. But what some people don't know are the unique and useful things we've done with it.

Consider this new version of 1-2-3 for Windows™ Release 1.1. Which now includes per-

formance enhancements that make many of the things you do with it a lot faster. From printing and screen response to file linking and loading the application.

What's more, 1-2-3 for Windows has innovations that other spreadsheets, such as Microsoft® Excel, don't have. Such as dialog boxes that give you the option of selecting a range before a function or a function before a range. The Solver technology that



*Direct from Lotus. Offer may expire without notice. **Please have your credit card and product package ready when you call. In Canada, call The World's Most Popular Spreadsheet are trademarks of Lotus Development Corporation. Classic is a registered trademark licensed to

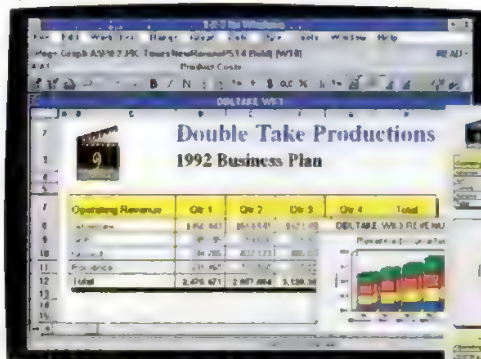


Only 1-2-3 for Windows offers SmartIcons™—our customizable icon palette—for one-click access to your most frequent tasks. And unlike the Toolbar™ in Microsoft Excel, only 1-2-3 for Windows lets you create your own unique icons and place them anywhere on the screen.

"Zoom in" and "zoom out" of your display to view and work on more or fewer cells.



With automatic print compression you can print a worksheet of any size on one page. On all printers.



known facts wn spreadsheet.

helps you find the optimal answer that meets your constraints. The ability to center text over multiple columns. And a unique clipboard function that preserves the data you've cut until your next edit. Along with everything else you see in this ad.

Now if this is all news to you, there's more. Because now you can upgrade from your current version of 1-2-3 to 1-2-3 for Windows for only \$129.* To order your upgrade or for a free auto demo, call **1-800-TRADEUP, ext. 6595****

1-2-3 for Windows

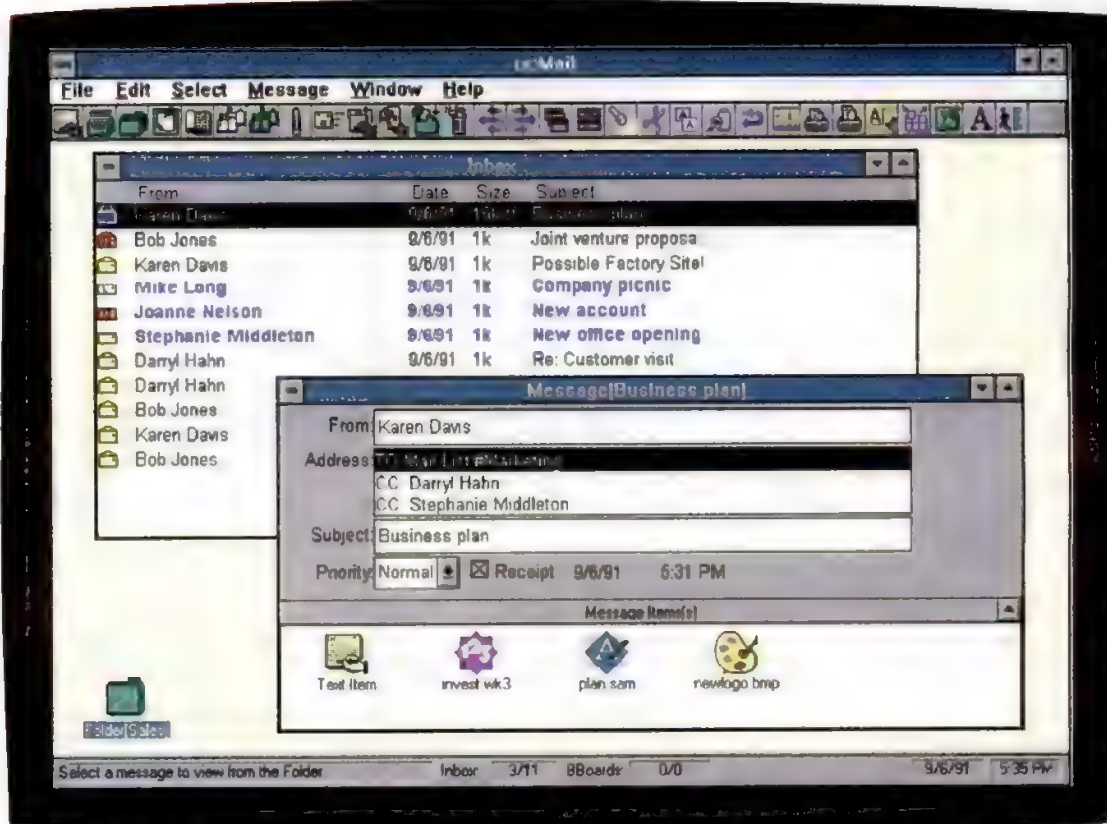
1-800-GO-LOTUS. ©1992 Lotus Development Corporation. All rights reserved. Lotus and 1-2-3 are registered trademarks and SmartIcons and Lotus Development Corporation. Microsoft is a registered trademark and Windows and Toolbar are trademarks of Microsoft Corporation.

Why is cc:Mail the lea

cc:Mail is so easy to install, learn and use, you can have your electronic mail system up and running quickly.



cc:Mail can send information across all of these computing platforms to reach everyone in your organization.



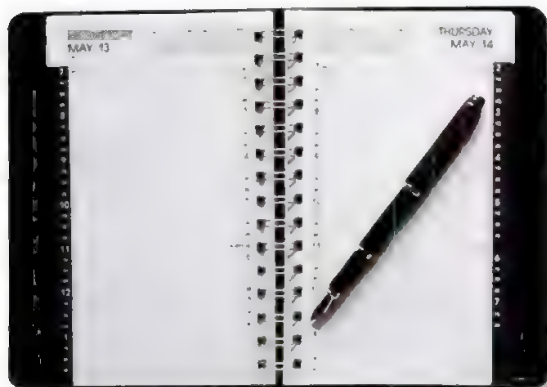
Over a million satisfied customers have already given cc:Mail a first-class rating. For example, Windows users love its easy-to-use interface, SmartIcons™ and application integration. And PC World says "Sending a cc:Mail message is easier than addressing an envelope and licking a stamp." 9/91*

ding e-mail package?

cc:Mail is built on a state-of-the-art, third generation architecture which means your mail system will grow as your company grows.



You can send a file from any mail-enabled application, such as 1-2-3® for Windows and other industry leading software programs without leaving the application.

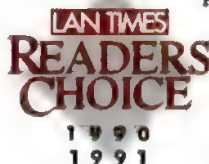


Keep things running on time with cc:Mail's advanced integrated calendaring and scheduling option.

It's easy to see why cc:Mail™ from Lotus® is the world's leading electronic mail package. Because it delivers more than messages. It handles just about any electronic mail need you might have. No matter how large or small your workgroup is. With it you can send text, files, graphics and faxes across all major local area networks such as Novell®, LAN Manager and Banyan®. Without needing new hardware.



Better still, it allows you to send electronic mail effortlessly back and forth from different platforms—such as DOS, Windows™ 3.0, OS/2® and Macintosh®—across the same LAN. Plus, with cc:Mail you can access public mail and even mainframe mail quickly and easily.



Our newly released cc:Mail for Windows takes full advantage of Windows 3.0. Support of Dynamic Data Exchange lets you easily send other mail-enabled Windows files from within those applications. For example, you can send a report you've written with Ami Pro™ for Windows across the country while the application is still on your desk top.

Plus, cc:Mail is the first package of its kind to take advantage of a new, fully scalable messaging architecture. This means cc:Mail will grow along with your business. Whether you're adding six new users, 6,000 or 60,000, cc:Mail is a proven solution. As *PC World* has said, "It's clearly a best buy." *PC World*, 9/91*

For a free demo disk of the cc:Mail Macintosh, Windows or DOS Platform Pack of your choice, call us today at 1-800-448-2500.

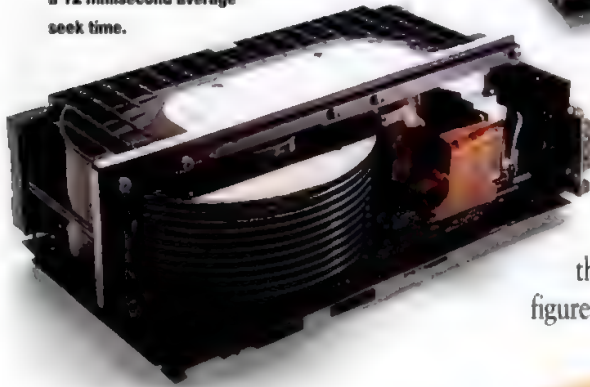


cc:Mail from Lotus

The first name in disc drives is now the first name in performance, too.

For years, Seagate has set disc drive industry standards for availability, reliability and product range. But you may

This 2 head parallel Sabre-7 (ST83050K) gives you 3 gigabytes of storage in an 8" form factor, with a transfer rate of 9.34 megabytes per second and a 12 millisecond average seek time.



be surprised to learn that we're consistently leading the industry in performance as well.

The drives featured here are available now—setting performance standards in systems like yours all over the world.

The 5.25" Elite 1 offers gigabyte-plus capacity (1382 megabytes) at 5,400 RPM, for an average latency of only 5.56 milliseconds.



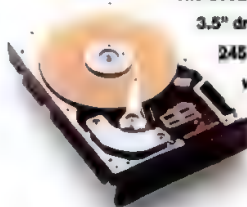
Today, as your competitive environment demands faster, less expensive processing than ever before, you need

At 2.5", the ST9144 offers 127 formatted megabytes with a choice of AT and SCSI-2 interfaces and an average seek time of only 16 milliseconds.

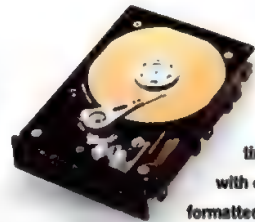


drives like these. Because when you take a few milliseconds' performance advantage and multiply it by thousands of transactions a day... well, the results translate into some figures that might surprise you.

The ST3283 family of 1" high 3.5" drives holds more than 245 formatted megabytes, with a 4,500 RPM spindle which reduces latency to 6.67 milliseconds.

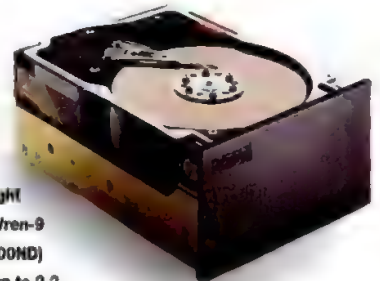


In fact, depending on the amount and nature of processing you do, high-performance drives like these can save you enough to pay back your disc drive investment within weeks—or days. For help in selecting the



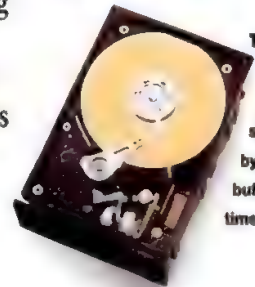
The digital servo on this ST3600 family of low-profile 3.5" drives reduces average seek time to 10.5 milliseconds, with capacities up to 525 formatted megabytes.

drive you need, or for more information about any Seagate drive, call Seagate at 408-438-6550 or contact



This full-height 5.25" Wren-9 (ST42100ND) offers up to 2.2 gigabytes of storage and a synchronous data transfer rate of up to 20 megabytes per second.

your authorized Seagate distributor. And get on a first-name basis with performance, Seagate style.



The 3.5", half-height ST11200 family, with up to 1.2 gigabytes of storage, boasts a 256 kilobyte multi-segmented cache buffer and an average seek time of 10.5 milliseconds.

 **Seagate**

PLATFORMS: How the PC Stacks Up

Temptation abounds. You want the power of a Sun workstation, the ease of a Macintosh, the cool elegance of a NeXTstation. But when it comes to getting your work done, you come back to the PC.

by Jim Seymour

It's so tempting. You see *Beauty and the Beast* and marvel at that gorgeous photographic-quality background in the ballroom dancing scene. Then you read that the background was created with a Silicon Graphics IRIS Indigo workstation.

Or you see an elegant technical document, 890 pages long, and learn that it was put together on a NeXT workstation with the desktop publishing program *Frame-Maker*.

Or you go to a conference and watch a dazzling multimedia presentation, and at the end the speaker says she assembled it herself on a Macintosh.

Or you sit down with the space planner, who shows you the plans for the reorganization of your company's office space. He takes you on a three-dimensional walk-through so realistic that you see in an instant how much better his new



plan is than the present one. And he is running it on a Sun SPARCstation.

Ooh. Envy. Lust. But wait a minute. Don't these people understand? Desktop computing is done on IBM-compatible personal computers, not on weirdo engineering workstations or a computer named after a fruit. Don't they get it?

Or maybe, just maybe, there is something *you* don't know? Is it possible that the grass really is greener on the other side of the fence?

We wondered about that. So we rounded up three exemplary platforms—the new Apple Macintosh Quadra 700, the Sun SPARCstation 2GX, and the dazzling NeXTstation Turbo Color—to compare with today's best PC-platform machines. And we compared the four platforms on the closest thing we could find to a level playing field—several level playing fields, in fact.

The result? Nice machines, impressive in some ways, but no sale: We'll stick with the DOS/Intel world, thanks. We want to get our work done, not make movies or design aircraft manuals.

And we think you do, too.

Unless, of course, your work is making movies or designing aircraft manuals (in which case one of these niche machines may be right for you).

MACINTOSH DREAMS

Rare is the PC user who hasn't been tempted by another kind of system. The Mac is the obvious seducer: Though outnumbered in unit sales about eight to one by PCs in 1991, the Mac has gained attention far beyond its numbers. As business computing's second standard behind the PC, it has achieved critical mass and seems likely to hold that standing by virtue of its easy-to-use applications and Apple's relentless emphasis on pushing the Mac into every emerging niche market. In fact, Apple often creates those markets (desktop publishing, desktop presentations, and multimedia are examples).

For the real power user, though, it is not the Mac—which pays a terrible price in sheer computing performance for its pretty face—that grabs our attention, but the Unix-based workstations from Hewlett-Packard, NeXT, Silicon Graphics, Sun, and others.

This is not surprising. Workstations, which have their roots in the performance-at-any-price school of computer design, now compete in a price-performance contest that rivals anything in the

deep-discount direct-sales PC marketplace. Now driven primarily by RISC (reduced instruction-set computing) chips—themselves products of the performance-is-all school—these Unix workstations dominate the scientific and engineering desktop-computing world.

Unix is not a friendly place for the unwary, though, and neither business users nor business software applications have taken many steps across the Unix line. Unless you can live without the great majority of standard software packages you have grown used to, the workstation market can still be a pretty lonely place.

What is a jaded PC user to do? If you're bored by the notion of 50-MHz 486s, 300MB hard disks, and 8MB to 16MB of RAM in your desktop machine, should you look into workstations or maybe the

Mac as the next logical step up the power-computing ladder?

In a word, no. And let's get that straight from the beginning: No sane PC user abandons the world of DOS machines for workstations simply to get more power.

Workstations and Macs do have a place, to be sure, but not as a step up for PC users. Moving to a Mac or a workstation makes sense only if you must have one of these machines for a specific vertical-market or technical application. It makes little sense for the experienced PC user to leave the world of PC-platform machines—and especially the world of DOS applications—for the world of workstations.

Though much of that decision is based on the far smaller universes of software packages available for these non-DOS platforms, that applications-centered view dodges the raw power issue: Aren't these



SUITABILITY TO TASK

The Mac leads the pack for graphics, and nothing beats the Sun's engineering and scientific applications. But for overall utility, the PC still wins.



Applications integration ranks each platform on its ability to incorporate data from different applications into one document, using such technologies as the PC's object linking and embedding (OLE) and dynamic data exchange (DDE) or the Mac's Publish and Subscribe.



High-end graphics rates the availability, capabilities, and performance of packages designed for desktop publishing and presentation graphics.



Office productivity assesses availability, speed, ease of use, and cost of such programs as spreadsheets and word processors.



Engineering and science evaluates the availability, performance, and connectivity options of engineering and scientific applications.



PC connectivity rates how each platform connects to a PC network. This rating takes into account such factors as the need for special hardware, the availability and cost of software, and ease of use.

Suitability to Task

Product Name

Applications integration



Engineering and science



High-end graphics



Office productivity



PC connectivity



4—Excellent

3—Good

2—Fair

1—Poor

COMPARISON PLATFORMS

workstations a lot more powerful than even the highest-end DOS machines? And won't they always be a lot more powerful? No.

PRICE/PERFORMANCE TODAY

Sure, high-end workstations, which can cost \$50,000 to \$75,000 when fully configured, have more raw computing firepower than today's 50-MHz 486 machines—which when similarly configured cost maybe a tenth as much as the workstations.

Remember that this power is not necessarily accessible to you and to the applications you want to use. For example, take a look at the test results for *WordPerfect* running across these platforms. Even when the mips are higher, the performance in standard applications isn't. The workstation's extra power is applied to faster graphics processing or to running Unix itself. Unix is an incredible power hog that requires 16MB of memory as a bare minimum (32MB if you would like to do some serious work), plus 80MB or so of disk space for the operating system alone.

You're not going to get faster *Lotus 1-2-3* recalcs on these machines than on your trusty \$3,000 33-MHz 486 clone. In fact, there is little difference in recalc speeds on any of these platforms.

PRICE/PERFORMANCE TOMORROW

The second side of the coin is what happens over the next few years. On the workstation side, things are sure to get faster. As indicated, the workstation market—especially the under-\$5,000 and under-\$10,000 machines—is viciously competitive. In the first category, vendors will sell you a diskless workstation with 8MB of RAM and a monochrome monitor, but you will never get any work done on it. In the under-\$10,000 class, you will get 16MB of RAM—enough to run your programs—and at least a small disk and mediocre color. That's where the real competition is these days. But on the PC platform side, things are even more interesting. Most of the easy performance gains made possible by moving from CISC (complex instruction-set computing) to RISC chips in workstations have already been made. From here on, it's grind-it-out time. Intel's P5, or 586 chip—the next-generation flagship of Intel-based computing—is expected to appear late this summer.

Look for 586 machines at Fall Comdex. These are going to be very hot machines,

indeed. Intel has talked about 100-MHz 586s coming before very long, and those are going to be screamers. The 586 chip looks as if it will deliver 100-mips PCs.

But wait; there's more.

The P6, or 686 chip, is waiting in the wings. Normally, the 586 would have appeared in 1993 and the 686 two and a half to three years later—say, in late 1995 or 1996. But Intel did something very smart. When it started work on the 586, the company split its development teams. Rather than following the traditional microprocessor development cycle—a serial process in which once the design for a new chip is locked up, the design team moves on to begin work for the next-generation silicon—Intel developed the 586 and 686 in tandem. Thus, the 686 will likely be available years sooner than most PC designers and makers had anticipated, with the result that far more powerful PCs are coming in two waves: the 586 boxes later this year and the 686 machines

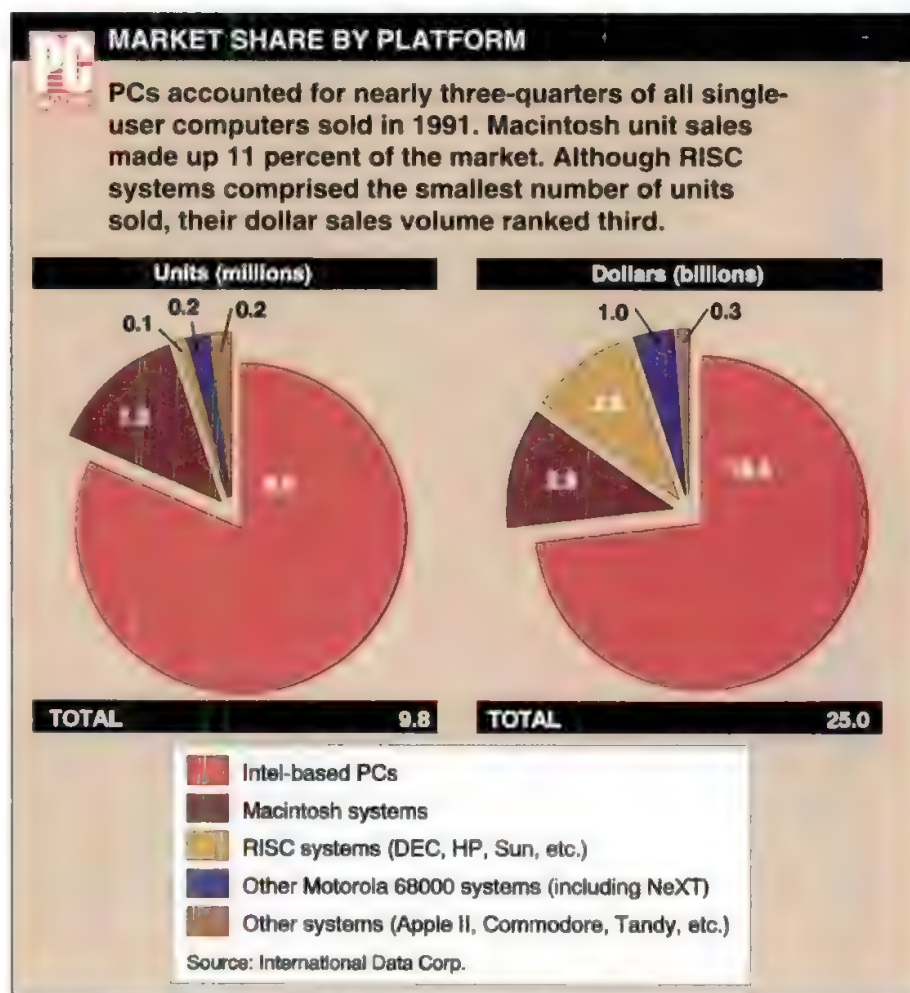
late next year and in early 1994.

It would be foolish to try to predict exactly how machines not yet built, using chips not yet designed, will perform against other machines. But it is a fair guess that by a year from now, high-end Intel-based PCs will have caught up with comparable workstations, and that a year later, new Intel-based machines may be pushing into the lead. And they will do it without forsaking compatibility with the vast range of DOS, Microsoft Windows, and Microsoft Windows NT applications that will by then constitute the universe of available software for Intel machines.

CROSS-PLATFORM COMPARISON

It is always difficult to construct cross-platform tests that really compare apples to apples. For our tests, we began by looking at how implementations of same-name commercial business software packages performed on each machine.

We readily acknowledge that this is not a perfect test of relative computing power. Although different implementa-



tions of the software might have the same name, the versions of *FrameMaker*, *Lotus 1-2-3*, *PageMaker*, *Wingz*, and *WordPerfect* that we used for cross-platform testing are very different animals. As much as software publishers like to be able to reuse and share code among products (Aldus, for example, says that about 70 percent of the code in *PageMaker* for both Macs and PCs is the same), there are always critical differences in how and how well programmers bring up old-favorite products in new environments.

Although *WordPerfect* may be a stellar word processing product for the PC

and the Mac, its implementation on the SPARCstation, for example, is pretty poor. It is no dazzler on the Turbo Color, either. On the Quadra 700, *WordPerfect* begins to look better. Yet, like every other cross-platform general-business application we tested, it really came into its own only on a PC-platform machine.

Even in cases where the quality of a product's implementation is approximately equal on two or more platforms, we found it simply ran faster on the DOS machine. Aldus built its business with

PageMaker on the Mac, for example, and the current Mac implementation (Version 4.2) is very, very good. Yet when we loaded the current version of *PageMaker* (4.1) on the Dell PowerLine 450DE, the software had a snap, crackle, and pop that we never saw on Apple's Quadra 700. Changing pages, moving among different-magnification views, and reformatting text all were snappier on the PC. That's quite different from a few years ago. *PageMaker* has become better as the PC has become faster, but it has not improved as rapidly on the Mac.

To be fair, there are advantages to the

SILICON GRAPHICS: Hidden Power

by Jim Seymour

While DEC, HP, IBM, Sun, and a handful of other high-profile workstation manufacturers get most of the attention, a much smaller and arguably more interesting workstation vendor is often overlooked. If you're looking for a workstation or two for high-level graphics work, you will find the alluring machines from Silicon Graphics especially worth a close look.

Compaq did. In fact, until recently the Houston-based PC giant was planning to sell Silicon Graphics' aggressively priced Indigo workstation series as Compaq's high-end "beyond-PCs" alternative. The deal came unraveled (keep reading), but it is easy to see what attracted Compaq's attention.

Although not as well known in the general computing community as its vastly bigger competitors, Silicon Graphics nearly owns the "visualizations" market. That market encompasses three-dimensional CAD, film animation, molecular modeling, earth-sciences mapping, and other graphics-intensive work. The company's machines are tightly focused on very fast handling of complex, anti-aliased graphics images; this ability has led to that dominance of image-manipulation computing. Built-in DAT/CD-level audio support has also led multimedia producers to consider the machines. This kind of computing power does not come cheap: High-end models, such as the 286-mips IRIS 4D/480S, cost as much as \$165,000.

The IRIS technology developed by

Silicon Graphics and the company's IRIX variant on Unix have been widely supported by software companies in the visualizations business, and PC users have for some time had a "Personal IRIS" version available as an expensive hardware add-in for PCs.

Silicon Graphics' work really came together in the stylish and remarkably inexpensive IRIS Indigo series, introduced last July and recently expanded at the high end. With four models, ranging from the \$9,500 IRIS Indigo to the \$27,000 IRIS Indigo Express, the company has delivered phenomenal desktop graphics processing power at very aggressive prices. (Workstation prices are often deceptive, however; typical as-delivered list prices for each of the four models in the IRIS Indigo line run about 20 to 50 percent higher than those base-priced configurations.)

These prices, of course, sneak into the upper reaches of the PC business; indeed, Silicon Graphics calls the Indigo units "RISC personal computers."

The company recently followed up on the success of the Indigo line with the more powerful IRIS Crimson series. Indigos are based on the MIPS R3000A CPU chip; the IRIS Crimson delivers extra power by moving up to the MIPS R4000SC chip, which relies on an on-board secondary cache for much of its performance boost.

For PC users, the kicker of the Indigo and Crimson lines is that these are the first Advanced Computing Environment (ACE)-compatible machines.

ACE was founded by Compaq, Silicon Graphics, and others last year; it is supported by Microsoft, which committed to move Microsoft Windows NT to the R4000 chip, around which ACE machines are to be built.

ACE's premise was to move aggressively to establish the next PC technical standard, rather than waiting for IBM and Intel to stake out that ground. The ACE consortium has looked a little wobbly lately, but some still believe it will create a viable commercial standard.

In support of Compaq's plans to bring out Indigos as its new high-end machines, Compaq made a sizable investment in Silicon Graphics in 1991. But a change of management at Compaq—and the company's buffeting in the marketplace as its high prices grew more and more out of sync with what buyers were willing to pay—led to a strategic reassessment early this year; the distribution deal is off, and Compaq has sold its Silicon Graphics stock (at a tidy profit).

Silicon Graphics is still an outsider looking in at the PC market. But of all the workstation options PC users might consider when they look for more powerful machines for specific tasks, the Indigos and Crimson lines may be the most interesting.

And if Microsoft follows up on that promise to move Windows NT—and thus the world of DOS and Windows applications—PC users will want to look to the chip that lies at the heart of these powerful machines. ■

PageMaker/Mac version that don't show up in the PC version. Being able to access a variety of typeface weights directly by font name on *PageMaker* for the Mac is vastly better than picking a font under *PageMaker* for the PC and then applying Windows' often-ambiguous bold and italic "styles" to that font.

Not everything in computing is a matter of going faster; sometimes it's all about doing the job better, more easily, or in a more familiar way. And the Mac, especially, won points for such nonquantifiable measures.

Machine configurations also affect performance. The PowerLine 450DE, for example, had 16MB of RAM. The Quadra 700 had 4MB; the NeXT, 16MB; and the SPARCstation 2GX, 32MB. Those were the recommended RAM sizes, according to the machines' manufacturers. We acknowledge that the results might have been slightly different if we had stripped RAM out of the PowerLine 450DE or stuffed more RAM into the other machines. On the other hand, when we added 16MB of RAM to the Quadra 700, we were able to load larger files, but the programs didn't do their work much faster.

8 MILLION PCs

Quality implementation of brand-name business applications on various platforms is an interesting issue and goes right to the heart of the appropriate use of these machines.

As our "Market Share by Platform" chart shows, International Data Corp. estimates that sales of PCs totaled about 8 million machines in 1991. About 1.3 million Macs were sold, and the combined sales for all RISC-based workstations, plus all Motorola 680x0-series workstations (such as those from NeXT), totaled only about 346,000 machines.

If you were a software developer, where would you spend your development money: on applications for the DOS-Windows-OS/2 market, which now exceeds 65 million machines, or on the far smaller Mac and workstation markets?

Nonetheless, the Lotuses and WordPerfects of the world do port some of their products over to some of these other platforms. Why? Not, you can be sure, because the people who run WordPerfect think anyone is going to buy a SPARCstation for word processing, nor because people at Lotus think people are going to buy Unix workstations to run *Lotus 1-2-3*.

Rather, the software developers create

these packages as accommodation versions of their products. If an engineer using a SPARCstation needs to do a little bit of word processing now and then, WordPerfect would like him to use its product because then the company can tell the Information Systems managers at that company that WordPerfect can supply all their word processing software needs. Similarly, Lotus developed a version of *Lotus 1-2-3* for Unix because it wants to be a corporation's sole supplier of spreadsheet software.

The sales appeal of cross-platform interoperability is also an issue here. When Lotus, for example, can say that its DOS, Windows, Mac, and Unix versions can all exchange files more or less transparently—and Lotus deserves credit for doing this better than most other major vendors—that warms the heart of a network manager. Having struggled to get disparate platforms talking on the same network, he now also wants to hear that the users of those different platforms can make some sense of the files they can now exchange.

Multiple-platform implementations of name-brand software are therefore an effective selling strategy for software vendors. (The ultimate example of this may be Lotus's release of *1-2-3/M*, a mainframe version of *1-2-3* that can be accessed and run by terminals connected to a company's mainframe computer. It certainly looks like *1-2-3*, and it can exchange files with other *1-2-3* versions. Wow! But PC spreadsheet programs are all about interactivity and local processing power, not the batch approach and shared logic of big systems. That fact is discreetly ignored here. Until, of course, you ask Lotus how many copies of *1-2-3/M* it has actually sold.)

In other words, it's not that these workstation and Mac-based versions of the programs you use every day on your PC work better in those other environments. It is just that the programs are available to run in these environments if you really

need to do a little of that along with your other technically oriented work.

DOS: TIME FOR AN OVERHAUL?

We can't get away with talking only about the range and quality of applications that are available for these machines, or about the underlying hardware. We also need to address the glue that joins the two: the operating systems.

Here, the 80x86 world looks pretty shabby. If you are a believer in graphical user interfaces (GUIs), you owe it to yourself to spend a little time with Mac, NeXT, and Sun machines so you can admire, respectively, their Macintosh System Software, Version 7.0 (System 7); NeXTstep; and *OpenLook* operat-

ing-system interfaces. And so you can get good and mad. By comparison with any other operating system, Windows and Version 2.0 of OS/2 come off so badly.

The Mac operating system, now a little long in the tooth after eight years of evolution, is still much more logical and appealing than Windows. So is Solaris, whose *OpenLook* strikes many Windows users as a GUI for grown-ups. And as both development environment and operating environment, NeXTstep is the model for the future.

Apple found its own way from scratch; the developers of Solaris and NeXTstep found ways to civilize the beast that lies at the heart of Unix. All three did much better under difficult circumstances than Microsoft has yet to do with DOS and Windows—systems Microsoft invented, owns, and controls.

And while Windows NT should be a big leap up from Windows 3.0 and the new Version 3.1 in reach and performance, it will face a technical challenge and maybe a beauty contest, too, with NeXTstep because NeXT's founder, the rarely predictable Steve Jobs, announced a few months ago that he is bringing NeXTstep to PCs.

Clearly, NeXTstep for 486s will not be a primary source of revenue, but rather a way of getting more applications written for his hardware. Of course, NeXTstep

The Mac operating system, a little long in the tooth after eight years of evolution, is still more logical and appealing than Windows.

◆ *It's always clear and sunny in Advertising Land. Well, just about nearly almost always.*



FOG

If You're Moving To Windows, Beware Of Advertising.



With all the activity in the world of Windows word processing these days, the air is getting thick with confusing claims and conflicting selling points. The good news is, you know what to do in situations like this. Proceed with caution, and remember, it's only advertising.

IT ALWAYS PAYS TO READ THE FINE PRINT.

We can understand a software company wanting to present its products in the best possible light. And we have no quarrel with hiring an outside research



firm to conduct a head-to-head test of competing word processors.



But honestly. Writing your own ground rules? Confining the test to just eight text-formatting functions (skipping text-entry altogether)? And limiting a national sample to twenty-four people? Does that strike you as a far-reaching and unfettered journey after truth? (Even *Family Feud* surveys a hundred people.)

◆ *Will you be standardizing on Windows, will you continue to use a mix of operating systems, or is it still too soon to say? WordPerfect's license will cover you in any event.*





- ◆ Which Windows word processor do eight out of ten people — or four out of five dentists — recommend?
It all depends on which eight people you ask, and how you phrase the questions.

You do have to admit it looked good in that big Wall Street Journal ad, though. Did you notice the part —  down at the bottom in 3-pt. Myopic Condensed type — where they offer to send you all the disclaimers to their study if you just call 1-800-323-3577? Maybe you *ought* to call. Less for what you'll learn about Windows word processing than about marketing as a blunt instrument.

DO YOU HAVE DOS FILES YOU NEED TO HANG ON TO?

 One of the fuzziest topics in Windows advertising today is file compatibility. Will you be able to get your old WordPerfect® for DOS documents into your new Windows word processor, or not? Yes or no?

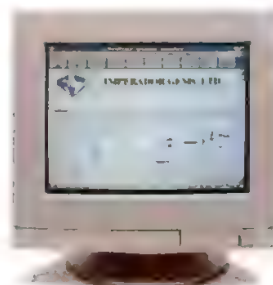
The surest way to find out is to ask for a demo with your own files. What you'll discover is, you can open your WordPerfect for DOS files in WordPerfect for Windows — directly. And you can go from Windows back to DOS the same way. The file formats are identical, so the files  are interchangeable.

And as we say in advertising (it's not *all* deceptive, you know), *no other Windows word processor we know of can make that statement.*

IF YOU RUN WINDOWS UP THE FLAGPOLE, WILL EVERYONE SALUTE?

One year into the Windows phenomenon, lots of people are happy. But there are others who aren't ready to change or  simply don't want to.

If your organization has some of each, we have a license that'll make life easier. Right now, you can run WordPerfect for DOS and Windows — under a single WordPerfect license — all on the same computer. With the word processor of choice, the choice is with the user. And that's where we think the choice belongs.



WordPerfect for Windows



That other brand

- ◆ When it comes to retrieving documents from WordPerfect for DOS, sometimes the magic works (left) and sometimes it doesn't (right).

To learn more about any of the WordPerfect programs or licensing, just give us a call at 1-800-526-5225.

WordPerfect®

WordPerfect is a registered trademark of WordPerfect Corporation within the United States and other countries. All other brands and product names are trademarks or registered trademarks of their respective companies. ©1992 WordPerfect Corporation.



for 486s will have to go up against the Microsoft juggernaut for Windows, the IBM juggernaut for OS/2, and soon the Apple/IBM juggernaut for their Taligent joint venture's new operating system. This makes the odds for Jobs's success look pretty long.

In almost every way—from nearly intuitive operation to programmers' hooks to the fit-and-finish "feel" for the user—Solaris, NeXTstep, and System 7 stand as rebukes to Microsoft's dominance of the PC world with its half-hearted Windows and DOS.

EASE OF CONNECTIVITY

Connectivity—among the same kind of machines and among dissimilar machines—is yet another issue to consider. At first glance, it seems that since every Mac, NeXTstation, and SPARCstation ever built has some form of networking built-in, these alternative platforms are way ahead of PC platform machines. On second look, however, it isn't so clear at all.

Macs have a feeble but easy-to-connect system, called LocalTalk, built-in. But for business-level performance, Mac users turn to Ethernet adapters—just as PC users do.

Sun and NeXT computers have Ethernet on their motherboards. Moreover, one of the benefits of the Unix operation system upon which they rely is that it embraces connectivity: Unix was designed from the ground up as a networking operating system.

Granted, then, all three of these systems allow easier out-of-the-box connection among their own kind than do PCs. If you're working in the engineering-design operations at Boeing, that may be all you need: You just want to hook together a bunch of engineers who are all running Unix workstations. Or if you are in a small graphic-design shop and need to connect a half-dozen Mac-using designers, the Mac's LocalTalk system can make your life easier, if awfully slow (we're betting you will still turn to an Ethernet answer).

PCs, by turn, need network interface cards (NICs) installed, at a price of \$150

to \$200 or so. And you have to buy a network operating system. (You still have to pull wires, mount connectors, hook up a server, and assign passwords and privileges, just as you do with networked workstations and Macs.)

In the PC business, though, the reward for adding connectivity on both the physical side (cabling) and the software level (network operating system) is that you have a lot more choices. Cabling can be cheap and good (10Base-T's unshielded twisted-pair) or costly and incredibly high-performance (fiber optics). You can opt for a fast, easy-to-

set-up peer-to-peer system, such as Artisoft's *LANtastic*, or at the opposite extreme go all the way up to Novell's *NetWare*. That range of choices also fosters easier connection of dissimilar systems, allowing you to sweep the occasional Mac or workstation into your PC-oriented network.

For those who argue that built-in networking and a native networkable operating system are still better than freedom of choice and flexibility, we have more bad news for you. Microsoft is adding peer-to-peer networking to Windows NT, and at Microsoft's first Windows Hardware Engineering Conference this March, the company started a push to get vendors to install network adapters on the motherboard of every desktop PC intended for office use.

That won't change overnight, but the benefits Microsoft is dangling in front of PC makers in promoting the "Windows PC" idea are likely to bring most major producers into the built-in networking fold.

You can find lots more on networking and internetworking these alternative platforms in "Across the Great Divide: PC-to-Mac Connections" in this issue.

SOFTWARE MIGRATES TO PCs

The final reason for thinking twice, or maybe ten or fifteen times, before jumping ship to workstations or Macs is that the

world is coming to the PC. Software developers have noticed, even if we haven't always, that improvements in processor speed, RAM capacity, bus width, disk size and transfer rate, graphics resolution, color-palette depth, and screen-redraw speed have turned PCs into very good platforms for their products.

If the only good reason to consider a non-DOS platform is a certain application you need in your work—for example, solids modelling with full three-dimensional rendering and near-real-time rotation of those models—ask when the software vendor plans to release a version for the PC.

Not so long ago, that question would have been foolish. At one time, vendors bundled custom software with workstation-level or minicomputer hardware. Later, they unbundled those applications from their pricey proprietary hardware and moved them to the "open systems" goal on Unix workstations.

The vendors are moving once again, and this time it's to the PC. They are tired of seeing markets fifty, a hundred, or a thousand times as big as their own crying for their software—if only it could be delivered on a PC. And they've watched other companies make the trip with great success.

FOR INSTANCE

Interleaf, a producer of industrial-strength desktop-publishing software, is a good example of that migration. In the early years of the company, Interleaf software was only available bundled with a pricey, proprietary workstation. Then Interleaf left the hardware-reselling business (they had been buying the machines from Sun and Apollo) and started selling Interleaf software unbundled for many Unix workstations.

In April 1988, IBM/Interleaf's *Publisher* was one of the first products announced in IBM's PS/2 blitz. It wasn't a great product, to put it mildly, but it got Interleaf into the PC world. Now, the company is in the PC business in a big way, with *Interleaf 5* for DOS and a 32-bit *Interleaf 5 for Windows* coming when Microsoft ships Windows NT. Interleaf positions its products as a big step up from the PC and Mac DTP (desktop publishing) champs—*PageMaker*, *Ventura Publisher*, and *QuarkXPress*—and as a front end for developing distributable, interactive electronic documents.

Interleaf is not alone in the high-end

*Vendors are tired
of seeing markets fifty,
a hundred,
or a thousand times
as big as their own
crying for their software.*



800

925

6616

Blount

Blount

PERFORMANCE TESTS

When you choose a platform, you will most likely select the software that runs best on the system you buy; it does not usually matter whether the package can run on all four platforms. But for the purposes of these tests, we determined how well the platforms could share data, using almost all of the cross-platform applications we could find.

We ran word processing, spreadsheet, and desktop publishing tests. For word processing, each platform could run *WordPerfect*; we were limited to Informix Software's *Wingz* for spreadsheets. No desktop publishing package was available across all four, so we ran *Aldus PageMaker*, Version 3.0, on the Apple Macintosh Quadra 700 and the Dell PowerLine 450DE, and *FrameMaker* on the Quadra 700, NeXTstation Turbo Color, and Sun SPARCstation 2GX.

FILE CONVERSION

We tested how well each machine could convert DOS files to each of the other platforms' formats. The Quadra 700 used the Apple File Exchange utility to read the disk and translate the data; the SPARCstation 2GX used MOUNT/PCFS and DOS2UNIX. The Turbo Color required no conversion utilities.

Our word processing document started as a 100K ASCII file. We formatted the file with a 12-point Times typeface, pasted in two of *WordPerfect*'s clip-art samples, and added a 14-point Times header with a gray underline bar. We formatted all but the first page in two columns. The file size increased to 112K.

None of the units translated a DOS document exactly, usually because of the different fonts available. Also, although each computer translated the data quickly, the Quadra 700 and SPARCstation 2GX had the overhead of starting up the conversion utilities. Of the three non-PC platforms, the Quadra 700 was slowest at this task and the Turbo Color the fastest.

We built a 1.2MB spreadsheet on the PowerLine 450DE and then converted it to a .WK1 format for testing the re-

maining three machines. Every system converted the spreadsheet perfectly, and only one glitch occurred: We had to increase *Wingz*'s memory allocation so the Quadra 700 could read the file. This unit converted the file in 85 seconds; the Turbo Color and SPARCstation 2GX each took more than 6 minutes.

WORD PROCESSING

The Dell PowerLine 450DE outperformed the other three on all the *WordPerfect* tests but one; on the spell-check test, it took 3 seconds longer than the Turbo Color and tied the SPARCstation 2GX. With the cursor key, the Dell PC scrolled from the top to the bottom of the 112K test document in less than a quarter of the time it took the nearest competitor, the Quadra 700, and was almost nine times as fast as the slowest, the Turbo Color.

SPREADSHEETS

We conducted the spreadsheet tests twice, once under *Lotus 1-2-3* and then under *Wingz*. For the recalculation test, a cell containing the formula $(\pi*10E+11) + \pi$ underwent nearly 3,000 mathematical manipulations, including square

roots, multiplication, division, addition, and subtraction. For the second test, a dual-key database sort, each machine sorted 1,000 entries in a 10-column grid so that the first column ended up in ascending order and the second in descending order.

Regardless of the platform, all four computers ran our spreadsheet tests at about the same rate.

DESKTOP PUBLISHING

Because we could not find a single DTP (desktop publishing) program that ran on all four platforms, we used *PageMaker* to compare the PC with the Mac. We used *FrameMaker* to compare the other three platforms with one another.

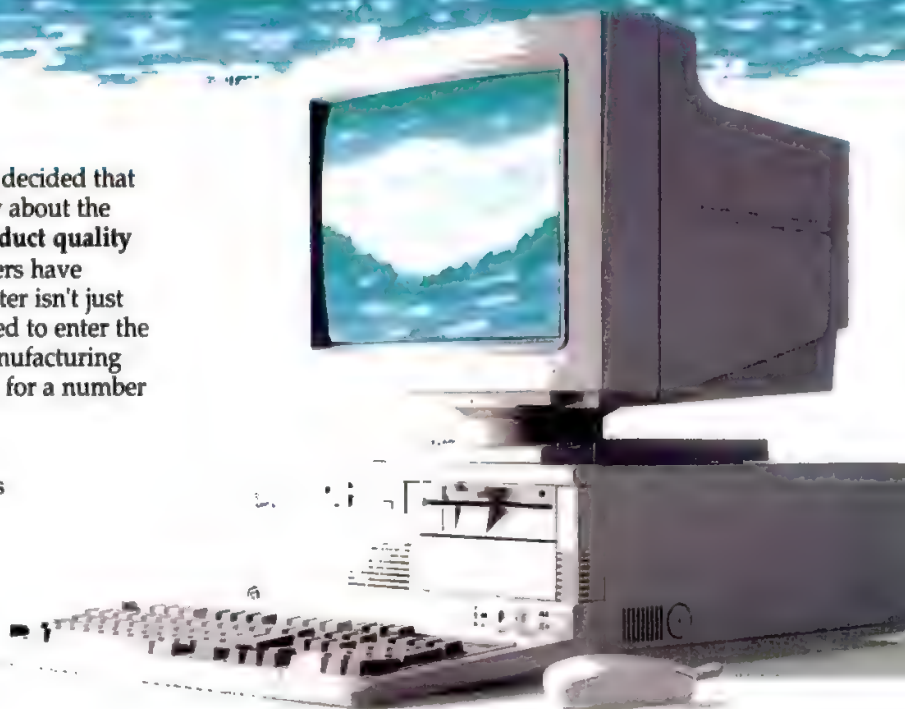
For the *PageMaker* test, we constructed a 25-page file and attached 10 TIFF images of various sizes to various locations. We then measured the time it took to flow a 100K text file around the graphics. The PowerLine 450DE handled the task in 15 seconds, compared with the Quadra 700's 29 seconds. For our second DTP test, we measured the time it took to repaginate a four-page *FrameMaker* document. Of the Mac, NeXT, and Sun platforms, the Turbo Color best handled the task. ■

	Dell PowerLine 450DE	Apple Macintosh Quadra 700	Sun SPARCstation 2GX	NeXTstation Turbo Color
FILE CONVERSION				
Convert 100K DOS ASCII file	35	85	70	65
Convert 1.2MB DOS spreadsheet	53	85	376	434
WORD PROCESSING				
Spell-check 17,855 words	10	31	10	7
Search and replace 100 occurrences	2	3	3	3
Cursor-key scroll-down	20	87	121	176
Mouse scroll-down	17	115	302	142
SPREADSHEETS				
<i>Lotus 1-2-3:</i>				
Recalculate BIGSHEET.WK1	11	12	13	N/A
Dual-key sort DATABASE.WK1	3	6	2	N/A
<i>Wingz:</i>				
Recalculate BIGSHEET.WK1	9	10	6	7
Dual-key sort DATABASE.WK1	1	2	1	1
DESKTOP PUBLISHING				
Flow 100K <i>PageMaker</i> 3.0 text file	15	29	N/A	N/A
Flow 100K <i>FrameMaker</i> text file	N/A	10	7	4
N/A—Not applicable: The software package does not exist for this platform Lower scores represent better performance				

All of us at Atlantic Computer have decided that we must finally let everyone know about the **substantial savings, excellent product quality and top customer service** that our customers have known for years. You see, Atlantic Computer isn't just another company that has suddenly decided to enter the computer business. In fact, we've been manufacturing and selling PCs through the direct channel for a number of years now.

We pride ourselves in the long term relationships we've established. Numerous government departments, small and medium sized businesses, large corporations, and thousands of individuals, have purchased from our complete line of computer systems.

We welcome you to call our sales team today. Whether you're a first-time computer buyer or technical expert, we are prepared to serve you promptly and efficiently.



Atlantic 386SX/16
80386SX 16 Mhz
Processor
2 MB RAM
1.44 MB Floppy Drive
40 MB Hard Drive
101-Key Enhanced
Keyboard
14" SVGA Color
Monitor
512 KB Video Card
MS DOS 5.0
MS Windows 3.1
MS Mouse

\$1190.00

Atlantic 386SX/25
80386SX 25 Mhz
Processor
2 MB RAM
1.44 MB Floppy Drive
80 MB Hard Drive
101-Key Enhanced
Keyboard
14" SVGA NI Color
Monitor
1 MB 32 K Color
Video Card
MS DOS 5.0
MS Windows 3.1
MS Mouse

\$1495.00

Atlantic 386/33
80386 33 Mhz
Processor
4 MB RAM
1.44 MB Floppy Drive
120 MB Hard Drive
101-Key Enhanced
Keyboard
14" SVGA NI Color
Monitor
1 MB 32 K Color
Video Card
MS DOS 5.0
MS Windows 3.1
MS Mouse

\$1770.00

Atlantic 486SX/20
80486SX 20 Mhz
Processor
4 MB RAM
1.44 MB Floppy Drive
120 MB Hard Drive
101-Key Enhanced
Keyboard
14" SVGA NI Color
Monitor
1 MB 32 K Color
Video Card
MS DOS 5.0
MS Windows 3.1
MS Mouse

\$1920.00

Atlantic 486/33
80486 33 Mhz
Processor
128 KB Cache Memory
4 MB RAM
1.44 MB Floppy Drive
170 MB Hard Drive
101-Key Enhanced
Keyboard
14" SVGA NI Color
Monitor
1 MB 32 K Color
Video Card
MS DOS 5.0
MS Windows 3.1
MS Mouse

\$2350.00

**Atlantic 386SX/20
Notebook**
80386SX 20 Mhz
Processor
2 MB RAM (exp. to 16 MB)
1.44 MB Floppy Drive
60 MB Hard Drive
84/85-Key Enhanced
Keyboard
VGA LCD
MS DOS 5.0
MS Windows 3.1
Microsoft Mouse
6.4 lbs
Docking station (optional)
Fax/Modem (optional)

\$2200.00

Your Satisfaction Guaranteed ... Two-year parts and labor warranty • Free on-site service* • 30-day money-back guarantee • Life-time toll-free technical support • Systems preconfigured and software installed at the factory before shipping • All documentation and diskettes included with the software



*On-site service may not be available in certain remote locations. NI - Non-Interlaced. All product names mentioned are trademarks or registered trademarks of their respective holders. © 1992 TFE Industries Inc. All rights reserved. Pricing does not include shipping charges. We reserve the right to change configurations and pricing without notice. Hours: 7:00 a.m. to 5:00 p.m. EST

Atlantic Computer

106 Main St., Houlton, ME, USA 04730
285 Restigouche Rd., Oromocto, NB, Canada E2V 2H2

TOLL FREE: 1-800-565-8334

YOU'RE USING PRESENTATION SOFTWARE AND THEIR EYES ARE STILL GLAZED OVER.



Let's face it. Audiences today are bored to death with presentation software. Everyone on the planet is using it. And it all looks the same. But there is a way to break the snooze factor—project your software on one of In Focus' new color LCD projection panels. Not only will your ideas look better, they'll have the waking power you need.

FORTUNATELY, OUR NEW LCD PANELS WILL MAKE

Simply slip one of our lightweight, portable panels on top of an overhead projector, and plug it into your PC or Mac. In mere seconds you're giving a full-color interactive presentation right off your computer. (Let everyone else fumble with transparencies and slides.) So you come across looking more polished, professional and persuasive. A change your audience will definitely notice.



YOUR IDEAS SCREAM OUT

And talk about efficient. Since you don't have to make hard copies of your presentation, turn-around time and outrageous costs are no longer issues. Plus, you can animate your information, even work with it during the meeting, which is infinitely more interesting than static data. All in vibrant colors, with unparalleled quality, saturation and contrast.

& WAKE THE

We offer a wide variety of products including the new 7000FX+ with 24,000 colors; the TVT-3000 active-matrix panel for multimedia; and the 7600XGA—the only panel for projecting stunning XGA images at 1024 x 768 resolution. So call 1-800-327-7231 for a free brochure with all the specifics. And bring dead presentations back to life.

InFocus[®]
S Y S T E M S
CALL 800-327-7231

DEAD!

PC DTP market, of course. Frame Technology, whose *FrameMaker* page-layout program started life as a Sun application, moved into the Mac and NeXT worlds and is also trying to claim the high ground in PC-based desktop publishing.

OTHER PLATFORMS' STRENGTHS

Experienced, happy users of these other platforms who have read this far without throwing the magazine against the nearest wall probably think we have given their favorite computers short shrift. Especially among Mac owners, the level of machine loyalty—even machine fervor—can be very high.

So we do want to acknowledge that for specialized applications, these alternative platforms have strengths and may be, at least for now, superior choices. That acknowledgement is reflected in our Suitability to Task ratings.

The Mac, for example, has a strong and well-deserved hold on the graphics market. The Mac was the development platform, test-bed, and first delivery platform for many high-end graphical applications; there was and still is some synergy between the Mac's interface and graphical orientation and these applications. It is also a good general-purpose computer, to be sure, though an expensive and relatively slow (for the money) general-purpose machine.

The Sun workstations as a class, and the SPARCstations in particular, are excellent engineering and scientific machines. Sun's commitment from its first day in business to deliver open systems built from standard parts has meant the company has led the workstation industry in driving prices down and performance up. Sun's work in pushing for a standardized version of Unix, as well as its leadership in developing the *OpenLook* Unix graphical interface, is also admirable. For many technical applications, a SPARCstation is the clear choice.

Steve Jobs's NeXT machines are cool, elegant, and powerful. Early models were expensive and limited, but NeXT learned its lesson and now delivers more machine for less money than the original NeXT cubes. And NeXT offers what may be the best development and operating environment, NeXTstep, in the desktop-computer business. NeXT applications offer a high degree of integration but so far are limited in number and scope. That's likely to change, though, as NeXTstep on the PC encourages more developers to use the

OUR CONTRIBUTORS

Julie Cohen is an associate editor of *PC Magazine*.

Jim Seymour is a contributing editor to *PC Magazine*.

M. Keith Thompson is a frequent contributor to *PC Magazine*.

Jon Zilber is the editor-in-chief of *MacUser*.

Don Crabb is the director of laboratories and a senior lecturer for the Department of Computer Science and the College at The University of Chicago.

tool they would really rather use anyway to build new applications.

DOS FOR BUSINESS

This brings us back to PC-platform machines. While these other platforms do have unquestionable strengths for special applications—and taken together, those areas represent a sizable market—the overwhelming majority of desktop computing in business today is performed on PC-platform machines.

The size of the DOS market means it will remain for the foreseeable future the richest opportunity for software developers, so it is hard to see the Intel-based machines losing the enormous advantage they have over all other desktop platforms in terms of applications variety and depth.

And the technological guns of the hardware industry are clearly focused on the 80x86 world. From faster graphics performance to powerful new microprocessors, the world's technology industries are focusing on the PC-platform market as an immense opportunity. That focus will mean the rate of progress will be even more rapid than in the past.

Taken together, the current status of these machines and both the near-term and further-out improvements that lie ahead argue persuasively for staying in the DOS fold.

No matter how tempting the world of workstations seems, no matter how seductive the ease of use of the Mac, the future of desktop computing lies in the successors to the PC-platform machines on our desks today. The force is with us.

Now, if you will excuse me, I'm going to take my son back for our seventh trip to *Beauty and the Beast*. We love that dancing scene.

FREE CONNECTIVITY CATALOG

If you have an interest in any of the following connectivity related topics, call for our catalog. It's jam-packed with on-target, sensible, carefully selected connectivity solutions.

- **Networking**
- **PC-to-PC data exchange**
- **Sharing printers**
- **Sharing a plotter**
- **Sharing a modem**
- **Sharing a FAX**
- **Inter-office E-Mail**
- **Computer/printer mis-matches**
- **Communication problems**
- **Data translation**
- **Protocol adapting and conversion**

You'll be dealing with true connectivity experts. Yet we can communicate with and help anyone, ranging from the most computer-illiterate to DP pros. Give us a try.

 **CONNEXPERTS®**
The connectivity experts...

800-433-5373

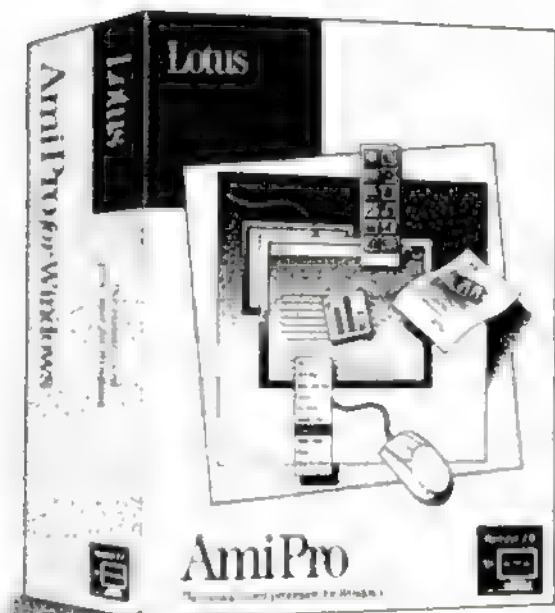
©1991 by Applied Creative Technology Inc. CONNEXPERTS is a registered trademark of Applied Creative Tech. Inc.

RIGHT WORD PROCESSOR. RIGHT WRITER.

Ami Pro V2.0 for Windows/RightWriter
Grammar Checker Bundle Offer.

From now until May 31, 1992, receive RightWriter® absolutely free when you purchase or upgrade to Ami Pro® Version 2.0 for Windows. You can even purchase the Lotus® Double Up† promotion and still receive a free copy of RightWriter.

Ami Pro from Lotus is the first word processor that lets you easily create documents combining words, pictures, graphs, symbols, drawings and colors. And with the grammar checking capabilities of Que®'s RightWriter, you'll know your documents are free of errors in punctuation, grammar, style and usage.



	Retail Price	Software Spectrum Price
Ami Pro 2.0	\$495.00	\$289.00
Lotus Double Up Promotion†	\$199.00	\$139.00
Ami Pro Upgrade	\$ 99.00	\$ 67.00
Ami Pro Competitive Upgrade (from most major word processors)	\$150.00	\$ 99.00

† Lotus Double Up Promotion Registered users of any version of 1-2-3® or any version of any Lotus word processor are eligible to purchase the Double Up package consisting of Ami Pro for Windows 2.0 and 1-2-3 for Windows for this price

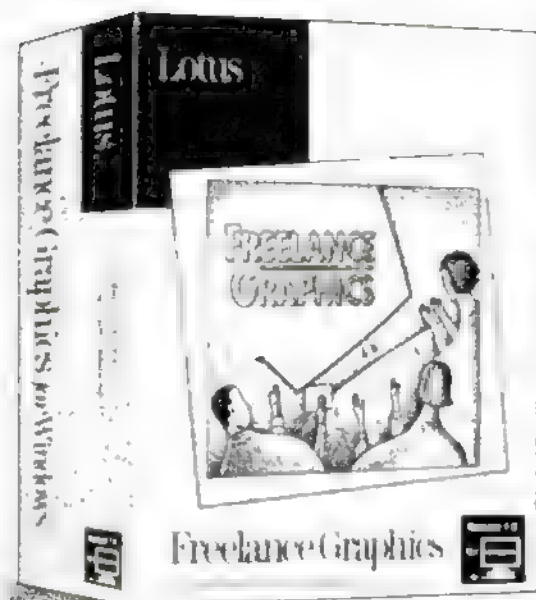
RIGHT PRICE. \$0⁰⁰

FREELANCE. FREE TEMPLATES.

Freelance Graphics for Windows V1.0/
Freelance Graphics for DOS V4.0 Lotus Custom Templates Bundle Offer.

Buy or upgrade to Freelance® Graphics for Windows Version 1.0 or Freelance Graphics for DOS Version 4.0 and receive Lotus® Custom Templates free. Create presentations easily with the more than 60 SmartMasters™ design sets in Freelance that provide design elements, arrange page layout, assign fonts and apply color automatically.

Lotus Custom Templates provides a fun and easy way to produce fax cover sheets, announcements, notebook spines and covers, cards, certificates and more. And from now until May 31, 1992, it's absolutely free with Freelance for Windows or DOS.



	Retail Price	Software Spectrum Price
Freelance Graphics for Windows 1.0	\$495.00	\$339.00
Freelance Graphics for DOS 4.0	\$495.00	\$315.00
Freelance Graphics for Windows Upgrade	\$150.00	\$101.00
Freelance Graphics for DOS Upgrade	\$150.00	\$ 99.00
Freelance Graphics for DOS Competitive Upgrade (from any DOS graphics package)	\$150.00	\$114.00

Take advantage of these special Lotus offers from Software Spectrum and in addition to a competitive price, you can count on Software Spectrum's top-notch technical support, knowledgeable sales people and same-day shipping of all orders received before 4:00 p.m. (Central).

**SOFTWARE
SPECTRUM**

1-800-824-3323
7:30 a.m. to 6:30 p.m. Central.

The Macintosh: The Choice for Graphics

The Apple Macintosh has the software, the GUI, and the installed base to be the premier platform for graphics, desktop publishing, and multimedia. The latest crop of low-cost Classics and high-performance Quadras has also brought the Mac's performance in line with comparably priced Intel-based machines.

by Jon Zilber

The Apple Macintosh is the premier platform for graphic artists, desktop publishers, and creators of multimedia-based presentations and training materials. While the PC is improving in this arena, it lacks the Mac's advantage of having a whole culture that has grown up around its graphics features. Most of the installed base of service bureaus and free-lancers in desktop publishing have chosen the Mac as their standard.

There are two reasons for the Mac's superiority in graphics applications. First, the Mac has claim to an unmatched body of widely used, tried-and-true applications that are still unavailable on a PC. Second, the Mac's architecture, designed for a graphical user interface (GUI) from its inception, is optimized for visual applications.

That GUI orientation was, until recently, also the Mac's weakness in business applications, though the flatter learning curve and simpler document-creation tools can compensate for some recalculation deficiencies. The user interface carries with it a substantial computational overhead, which has hindered the Mac's performance in character-based applications such as spreadsheets and word processing. Motorola's 680x0 family of microprocessors powering the Mac has lagged behind its Intel 80x86 counterpart in price and performance, but the gap is closing. Macs powered by the 68000 and



68020 are primarily used for word processing and related tasks; 68030- and 68040-powered machines are suited to graphics and desktop publishing.

PRICE AND PERFORMANCE

The Macintosh family has three segments and comprises a twelvefold range in performance from the top to the bottom of the line. The Apple Macintosh Classic and Classic II, part of the compact series, feature built-in 9-inch monochrome monitors and lack any internal expansion slots. The modular Macs (the LC, IIsi, IIfx, and the top-of-the-line 68040-based Quadra 700 and Quadra 900) support color monitors and have slots

for bus-based cards and processor-direct daughterboards; these are ideal for file serving and computation-intensive graphics. Base-priced models range in list price from \$999 for the Classic to \$7,199 for the Quadra 900.

The Apple Macintosh Quadra 700 we tested came with a Motorola 68040 CPU running at 25 MHz, 4MB of RAM, a 160MB SCSI (small computer system interface) hard disk, a 640-by-480 color display, a 13-inch color monitor, and Macintosh System Software, Version 7.0 (System 7). This configuration has a list price of \$6,999. A configuration with a 400MB hard disk and 8MB of RAM (which would make it comparable with the other machines we tested) would cost \$7,998, in the range of the PC platform and the NeXTstation Turbo Color.

Though the Quadra 700 and the Dell PowerLine 450DE performed about the same on the spreadsheet tests, the PowerLine 450DE performed three of the word processing tasks—spell-check, scroll-down, and Microsoft Windows down-arrow—in one-third or less of the Mac's times. (On the other hand, the Quadra 700 scrolled down the screen significantly faster than the machines from NeXT and Sun.) In our desktop publishing tests, it took the Quadra 700 almost twice as long as the PowerLine 450DE to pour a 100K Aldus PageMaker 3.0 text file (29 seconds for the Mac and 15 seconds for the

PC), but pouring a similar 100K file into *FrameMaker* took the Quadra 700 only 10 seconds. (Since *FrameMaker* is not yet available for the PC, we could not do a comparison.)

Since the PowerLine 450DE, Turbo Color, and Sun SPARCstation 2GX that we tested contained 16MB of memory or more, we installed an additional 16MB into the Quadra 700 and repeated our spreadsheet tests. The results were virtually unchanged.

Designed for more intensive computing such as scientific applications, an Apple Macintosh IIfx (with a 40-MHz 68030 processor) scored a SPECmark value of 3.4 (while running Apple's Mac-compatible A/UX Unix operating system) on the SPEC (Systems Performance Evaluation Cooperative) benchmark tests. Apple estimates that the Quadras would have a SPECmark value of approximately twice that number. This does not compare favorably with the SPECmark ratings of 25 for the SPARCstation 2GX and 26 for the PowerLine 450DE.

As with a PC, more memory on a Mac will not necessarily increase the speed with which tasks are performed, but it will allow you to do more things at once. To operate System 7, the most current version of the Mac operating system, 4MB is recommended. But if you plan to run many applications simultaneously or if you work with large files, such as lengthy page layouts or full-color images, you will need more than the 4MB that shipped with our test model. (Currently 1MB costs around \$40.)

The Mac also differs from the PC in handling memory allocation. Although most Windows applications handle this task automatically, each Mac application has a recommended memory allocation—often 1MB or less. If you plan to work with files that exceed that number (such as the 1.2MB spreadsheet we loaded for our *Wingz* tests), you should increase that allocation. This change is easy to make:

Choosing Get Info from the Files menu brings up a box that tells you how much memory is allotted to the program. Increase the number, restart the program, and you will be able to accommodate all of your data.

WHAT MAKES THE MAC SPECIAL

Speed has never been the Mac's defining quality. Instead, the Mac has been differentiated by its user interface and its applications.

One major advantage of the Macintosh has been its consistency. Because all Mac applications theoretically follow user-interface guidelines that were established by Apple, once you have learned how to use a word processing program, figuring out how to use a spreadsheet or a page-layout package is much easier. (And learning your first Mac application is much simpler than learning your first non-Windows DOS application.) Almost all of the habits you learn in one application will be applicable to working in any other application.

Although Apple and its third-party developers are not always one big, happy, extended family, the fact that the hardware and the operating system come from a single source has created an unambiguous platform for developers. By comparison, developers for the PC platform have the mixed blessing of competing operating environments—different incarnations of DOS, Windows, *GeoWorks Ensemble*, and OS/2, for instance.

But while Macintosh users have not had as many choices, System 7 offers several features that are ahead of what PC



Still the top platform for DTP and presentation graphics, the Macintosh Quadra 700's ease of use and excellent programs make up for deficiencies in processor speed.

users have to choose from. These include:

■ **Publish and Subscribe.** Under System 7, different applications can publish and subscribe information generated in other applications. For example, a word processing document can subscribe to data generated in a spreadsheet; the data will instantly appear in the word processing program and will be automatically updated whenever it is changed in the spreadsheet. The applications that are publishing and subscribing do not even need to be on the same Macintosh; all of this activity can take place across a network of different users publishing and subscribing to each other's data.

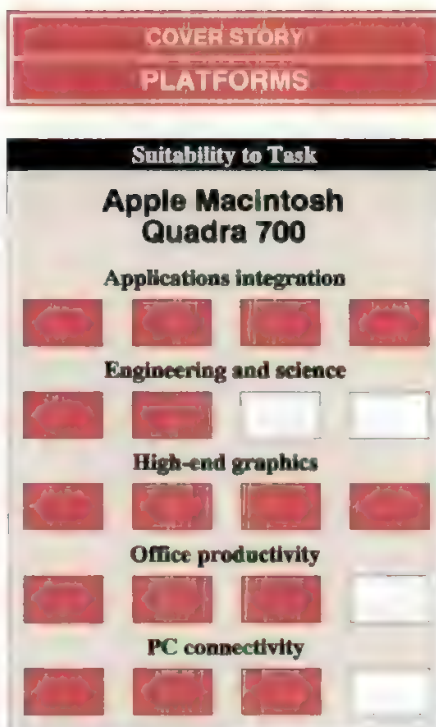
■ **Sound.** Ever since the humble original 128K Mac, all Macs have had sound playback capabilities, and most of the Macs released in the past 18 months have had built-in sound-input capabilities as well.

■ **Multimedia.** Apple's new QuickTime system extension makes video and animation other data types. With QuickTime installed on your Mac, you can view, cut, paste, and edit video sequences with the same ease that you can view and manipulate type and graphics.

For people who want something beyond System 7, Apple offers its A/UX version of the Unix operating system. A/UX Unix does something other Unix operating systems cannot: It runs a huge library of standard shrink-wrapped Mac applications. Under A/UX Unix, you can run Unix tasks in one window and standard Mac applications in another.

PC CONNECTIONS

In many respects, Macintoshes have been designed for networking in a way that PCs never were. Macs have always had built-in networking capabilities that let you connect a Mac to a shared printer or to another Mac quite easily (albeit at LocalTalk's sluggish data rate). New networking tools extend that plug-and-play philosophy to other kinds of networking, including Ethernet, ISDN (Integrated Service Digital Network), and mainframe connections. In fact, the Quadra 700 comes with an Ethernet connection, instead of the slower LocalTalk connection used on earlier Macs. The Mac's networking abilities also include features not available on any other platform, such as aliasing. An alias is an icon that acts as a pointer to the original file; it is not a copy of that file. Aliasing lets you have multiple references to the same document or application in different folders, or even on different



machines. It takes no additional storage space and frees you from having to reconcile changes made to multiple copies of a document.

For PC connectivity, Macs ship with a standard floppy disk drive that can read DOS-formatted disks directly using the included Apple File Exchange system software. But other third party products may be better choices. DataViz's *MacLinkPlus/PC* can convert among hundreds of application-specific Mac and DOS file formats. Dayna Communications' *DOS Mounter* and Insignia Solution's *AccessPC* provide a Mac-like on-screen representation of files on DOS hard disks. In addition, third-party DOS emulators are available; hardware solutions include Orange Micro's Orange-386 MS-DOS coprocessor, and software solutions include Insignia Solution's *SoftPC*.

Nearly all of the leading DOS applications have counterparts on the Mac that can seamlessly share data and networking connections. These include everything from networked applications such as Novell's *NetWare* and Lotus's *cc:Mail* to single-user packages such as *Adobe Illustrator*, *Aldus PageMaker*, *dBASE*, *FoxBASE*, *Microsoft Word*, *Microsoft Excel*, *WordPerfect*, and, most recently, *Lotus 1-2-3*.

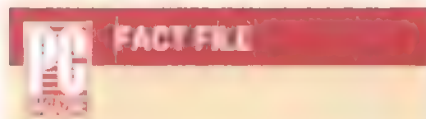
For networked connections to a PC network, you may have more choices with a Macintosh than with some of the other platforms compared here. Beyond simple file transfer, you can choose from a vari-

ety of options to let Macs share PC servers or PCs share Mac servers. For instance, Novell's *NetWare for Macintosh* (ranging in price from \$895 to \$1,995 for different configurations) allows Macs to transparently share data on a *NetWare* server and even run PC applications across the network. For more information about connecting your PC to a Mac, see the story "Across the Great Divide: PC-to-Mac Connections," in this issue.

CONCLUSION

If you are considering adding a Mac to your current lineup of PCs, you will probably want the best software for your needs. Standout graphics applications include Adobe's *Photoshop* (photo-realistic imaging software), Deneba's *Canvas* (drawing software), LightSource's *Ofoto* (scansimplifying software), Quark's *QuarkXPress* (page layout software), Strata's *StrataVision 3D* (rendering software), MacroMind-Paracomp's *Swivel 3D* (3-D modeling software), and Virtus Corp.'s *VirtusVision* (software for creating 3-D fly-through models).

Software developers for the Macintosh have a track record of being about 18 months ahead of their PC counterparts in the production of cutting-edge applications, particularly those for desktop publishing and graphics. Mac users had page layout software such as *Aldus PageMaker*, powerful drawing software such as *Adobe Illustrator*, and photo-realistic graphics packages such as *Photoshop* long before comparable products were available on the PC. The superiority of these products over many PC applications keeps Mac as the best choice for these tasks.



Apple Macintosh Quadra 700

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408-996-1010, fax 408-996-0275.

List price (tested configuration): \$6,999.

Motherboard: Motorola 25-MHz 68040 CPU, 4MB RAM.

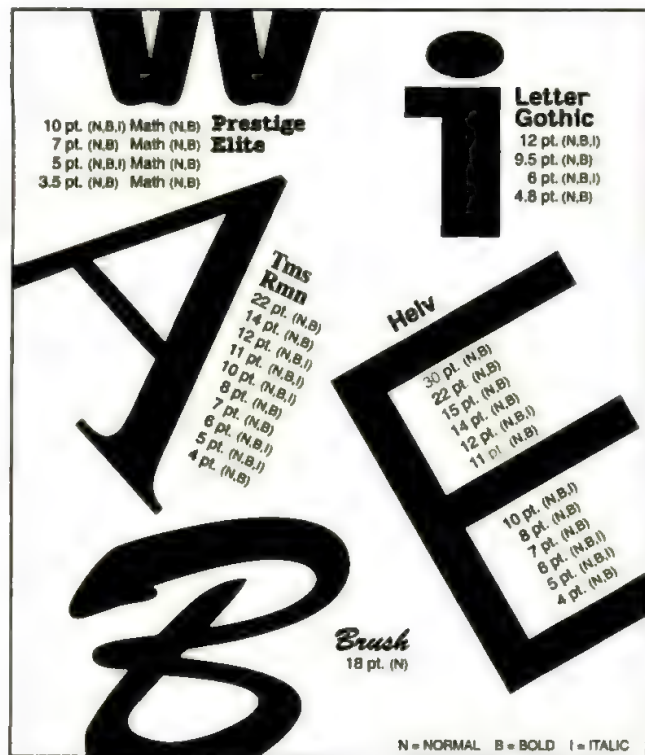
Storage: 160MB Apple SCSI hard disk, 1 44MB Apple SuperDrive floppy disk drive.

Display: 640-by-480 color output, 512K video RAM, 67-Hz 13-inch AppleColor high-resolution RGB monitor.

Software: Macintosh System Software, Version 7.0; *Claris HyperCard* 2.1; Macintosh Basics tutorial disk.

CIRCLE 490 ON READER SERVICE CARD

How to put all of these in your DeskJet printer,

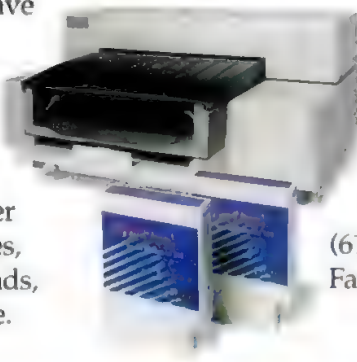


and keep more of these
in your pocket.

When you want just the right fonts for both personal and business documents, turn to 25 in One!™ for DeskJet, the all-in-one printing solution from Pacific Data Products.

The 25 in One! for DeskJet package comes in two versions, one for the HP DeskJet Plus and the other for the HP DeskJet 500/500C*. Each version contains two megafont cartridges with all the high-quality bitmapped fonts you need for your word processing, spreadsheet, and desktop publishing applications. And since 25 in One! for DeskJet offers fonts that would require you to purchase seven HP DeskJet cartridges, you'll save something besides just shelf space ...like CASH!

The suggested retail price for the HP DeskJet Plus or 500/500C version of 25 in One! for DeskJet is only \$149 — a substantial savings over having to purchase separate cartridges, whether you count it in Dollars, Pounds, Francs, Marks, Lira, or something else.



And 25 in One! for DeskJet includes 11 and 22 point fonts not offered in the HP cartridges.

25 in One! for DeskJet contains the most popular typefaces, including Tms Rmn, Helv, Prestige Elite and Letter Gothic, as well as the full Roman 8 and Math symbol sets. And it's compatible with the popular WordPerfect 5.1, Microsoft Word 5 and 5.5, Microsoft Windows 3.0, and WordStar 6.0 software applications.

So if you're looking for more fonts for your HP DeskJet Plus or 500/500C printer, call your nearest dealer and ask for the low-cost, easy-to-use solution, 25 in One! for DeskJet.

For information on our other popular, cost-effective laser printer enhancement products, contact Pacific Data Products, Inc., 9125 Rehco Road, San Diego, California

92121, U.S.A.

(619) 597-4679

Fax (619) 552-0889

**PACIFIC DATA
PRODUCTS**

Fonts displayed in the illustration above are from both versions of 25 in One! for DeskJet. The font selection for each version varies slightly.

* 25 in One! for DeskJet is compatible with the DeskJet 500C only when used with a black ink cartridge.

25 in One! is a trademark of Pacific Data Products, Inc. HP and DeskJet are registered trademarks of Hewlett-Packard Company. All other trade names referenced are the trademarks or registered trademarks of the respective manufacturer.

EUROPEAN OFFICES: Geneva Tel (41) 22.41.26.50, Fax (41) 22.41.06.82, France Tel (33) 1 39 23 20 00, Fax (33) 1 39 63 31 20, U.K. Tel (44) 442 23 14 14, Fax (44) 442 23 65 40

© 1992 Pacific Data Products

The Sun SPARCstation 2GX: A Number-Cruncher's Dream

The Sun SPARCstation 2GX's applications and power make it the ideal computer for serious engineering and science applications, and the Solaris operating system helps make Unix friendlier.



by Don Crabb

Let's get one thing straight. Most of you will not buy a computer based on the SPARC chip anytime soon. Unless you have a specific application or configuration that needs Sun Microsystems' fast Unix-based workstations, these machines represent performance levels, prices, and applicability far different from mainstream 386 PCs or even high-end 486 machines, such as the Dell PowerLine 450DE we tested for this report. In fact, because of the slow migration of mainstream office productivity software to the Sun platform, this system generally is a poor choice for basic business desktop computing.

Instead, the Sun SPARCstation 2GX excels at crunching floating-point numbers, rendering complex color rasters, pulling large chunks of data from file servers, and providing serious computing horsepower for applications like CAD, solids modeling, relational databases, statistical analysis, simulations, scientific applications such as real-time laboratory telemetry, engineering applications (including acoustics and acoustical modeling), and the like.

PRICE AND PERFORMANCE

The SPARCstation 2GX we tested was minimally configured and came in a pizza-box case 3 inches tall with a 16- by 16-inch footprint. It included a 40-MHz Type 4 SPARC CPU, which is based on RISC (reduced instruction-set computing) architecture, compared with the PC's CISC (complex instruction-set computing) architecture. The system also contained 32MB of RAM, 64K of cache memory, a

600 reasons why your should be

*No Apple LaserWriter
delivers more than
300 dpi—no matter how
much you spend.*



Announcing the first 600 dpi printer that's instantly compatible with your Macintosh *and* your budget: the new IBM LaserPrinter 10A.



*Just plug & print:
the LaserPrinter 10A is as
friendly as the Mac itself.*

For just under \$4000, it delivers what no Apple LaserWriter can at any price: true 600x600 dpi PostScript® printing. Up to four times the resolution of a LaserWriter printer,



POSTSCRIPT®
Software From Adobe

*Built-in PostScript
interpreter, with
5MB memory and
39 Adobe Type 1
scalable fonts.*

in a compact desktop package. High resolution, without the high finance.

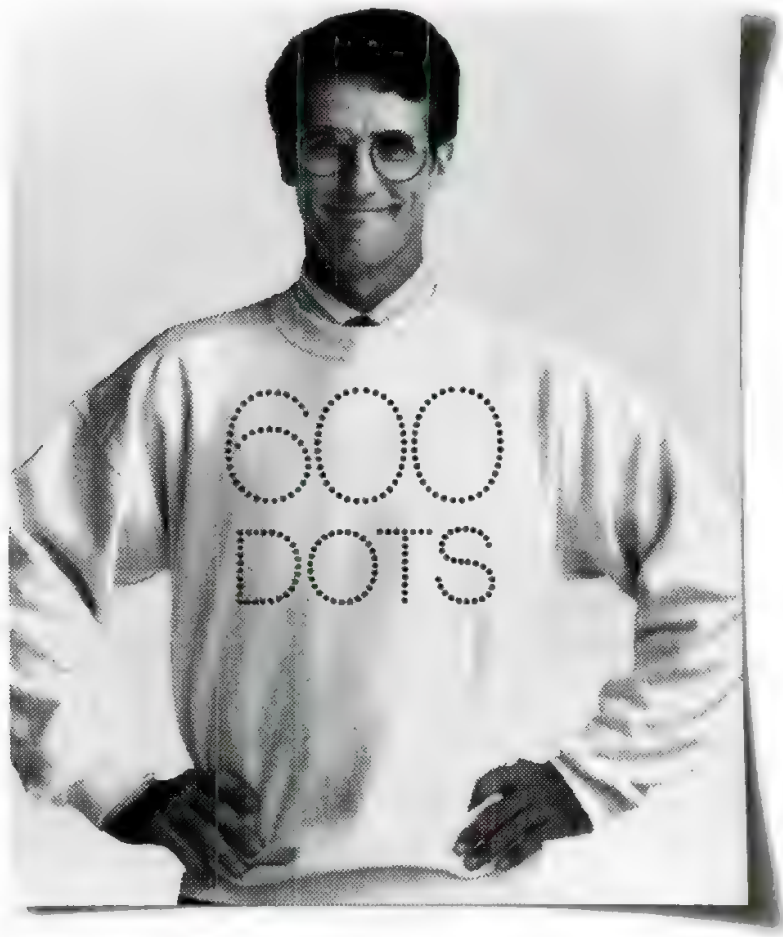
Beneath the unlikely nameplate of the IBM LaserPrinter 10A beats the heart of a born Macintosh printer: speedy Motorola 68020 processor, built-in LocalTalk connector, ample 5MB memory and PostScript software from Adobe®.

You also get the razor-sharp print quality, superb paper handling and reliability that won the

Dealer price may vary. Motorola is a registered trademark of Motorola, Inc. Adobe and PostScript are trademarks of Adobe Systems Incorporated, registered in the U.S. LocalTalk, Macintosh, and Mac are trademarks of Apple Computer, Inc., registered in the U.S. and other countries. System 7 is a trademark of Apple Computer, Inc. Aldus, the Aldus logo, and PageMaker are registered trademarks of Aldus Corporation. PC Magazine is a registered trademark of Ziff-Davis Publishing Company. PC Digest is a registered trademark of National Software Testing Laboratories Inc. (NSTL). IBM is a registered trademark of International Business Machines Corporation in the U.S. and/or other countries and is used under license. Lexmark is a trademark of Lexmark International, Inc. Output produced with the LaserPrinter 10 at 600 x 600 dpi. ©1992 Lexmark International, Inc.

THE NEW IBM LASERPRINTER

next Macintosh printer an IBM.



*But the IBM
LaserPrinter 10A gives
you true 600x600 dpi
output—for under \$4000.*

LaserWriter IIg

R

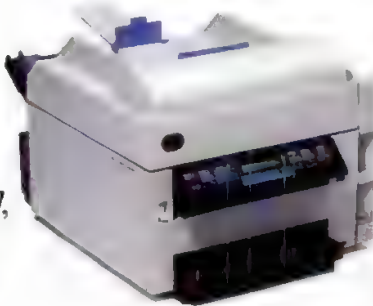
IBM

R

*True 600x600
dpi and more
precise toner
transfer make any
Mac document
decidedly crisper.
(6 x enlargement.)*

IBM LaserPrinter 10
a host of major awards
from *PC Magazine*,
Windows Magazine and
PC Digest.[®] Plus compat-
ibility with System 6 and 7,
elegant documentation,
even a customer-support
phone line, just in case.

The IBM LaserPrinter 10A
comes to you from Lexmark:



*The new IBM LaserPrinter 10A
won't monopolize your desk.
Or your budget.*

worldwide developer, manufacturer
and distributor of IBM personal
printers, typewriters, keyboards
and related supplies. For your
nearest dealer, call 1 800 358-5835
(in Canada, 1 800 663-7662).

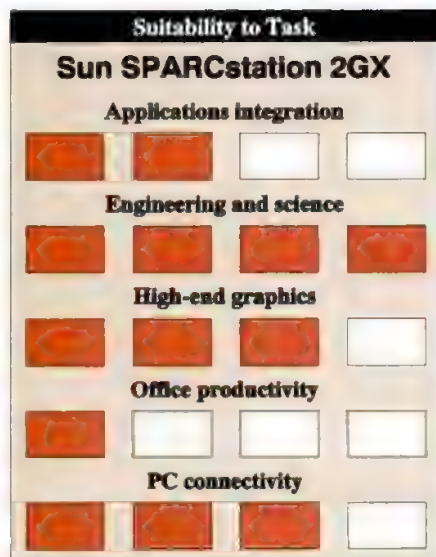
The new IBM LaserPrinter 10A
for the Macintosh. Insanely great
printing, at a surprisingly rational
price.

IBM Personal Printers by

LEXMARK[™]

Make Your Mark

PRINTERS. PAGES AHEAD.



1.3GB SCSI hard disk, a 1.44MB floppy disk drive, a 19-inch 1,152-by-900 color monitor, a Sun CD-ROM drive, a Sun tape drive, the Solaris 1.0 operating system, and built-in Ethernet circuitry that directly supports the TCP/IP (Transmission Control Protocol/Internet Protocol) and NFS (Network File System) protocols. Our test machine has a suggested retail price of nearly \$30,000—not outrageous, compared with a similarly packed Compaq Deskpro 486/50L, but far more than the typical PC. Sun is notorious for making whatever deal it takes to sell you its machines, and dealer discounts of 40 percent are common.

On our tests of business applications, the SPARCstation did fine in computation-intensive tests, such as spreadsheet recalcs and sorts (where it was among the fastest machines tested). But it did less well in more environment-oriented tests, such as scrolling or paging down.

For serious floating-point and benchmark tests that predict a computer's ability to run engineering and scientific applications quickly, the SPARCstation 2 family acquits itself brilliantly. The 40-MHz SPARC chip is rated at 28.5 mips, and using the SPECmark standard for benchmark tests, a basic SPARCstation 2GX produces a SPECmark value of 25. This is on a par with IBM RS-6000 RISC workstations and about 10 to 30 percent faster than equivalently priced and equipped DECStation 5000 workstations.

Sun makes dozens of other models, from lower-performance desktop units such as the diskless SPARCstation ELC (costing less than \$5,000 and fitting into a slimline case) up through high-

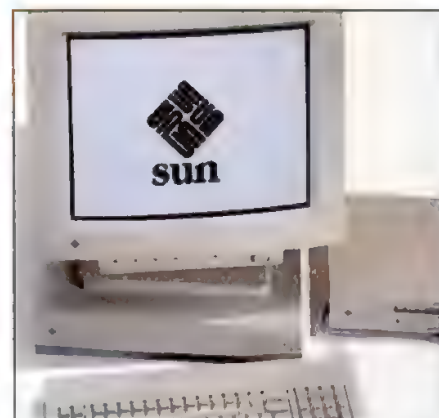
performance, rack-mounted and tower SPARCservers that cost more than \$100,000 and contain as many as eight CPUs. SPECmark values for these systems range from about 15 to nearly 120; every processor you add increases the performance by about 15 points.

WHAT MAKES THE SUN SPECIAL

Sun's current operating environment, Solaris 1.0, includes the multiprocessing SunOS 4.1.2, which is based on AT&T's Unix System V, Release 3. Solaris's *OpenLook* graphical user interface (GUI) and *DeskSet* desktop window and GUI manager run atop the windowing system environment: *OpenWindows*, Version 2.0. Also included are the Sun Open Network Computing modules (the NFS and the TCP/IP networking protocols) and a set of object-based development tools. Solaris is one of the slickest and most elegant Unix implementations on the market, and it feels much more like System 7 than Microsoft Windows 3.0. The GUI is elegantly designed and fast, and it will be familiar to Windows users.

Under Solaris, you can cut and paste, export and import data from other applications and other platforms (including PCs on an Ethernet network), and run shared-file systems with PCs that use the Sun NFS software or use the PC-NFS software. Solaris 2.0, which ships this year and is based on the System V, Release 4, standard, incorporates these features and will also be available on the Intel platform, using the same file systems as those found on the Sun platform.

Productivity applications such as the Sun versions of *WordPerfect* and *Lotus 1-2-3* work with the same file types on PCs, so you can share them directly over the PC network. Unix does not need some of the clumsier interapplication communications (IAC) techniques used on System 7's *AppleScript* and *AppleEvents* or on Windows' object linking and embedding (OLE) and dynamic data exchange (DDE). Embedding and updating a *Microsoft Excel* chart in a *Microsoft Word* for Windows document on the PC, for example, requires OLE and DDE. But users often find these techniques more directly controllable than Unix's arcane mechanisms. For this reason, Sun is now putting great effort behind its Object Request Broker, which will allow software developers and end users to create dynamic links between



The Sun SPARCstation 2GX's horsepower takes you through the most processor-intensive engineering and scientific applications.

programs. (OLE support, by contrast, is not available for custom applications.)

You will find more CAD and high-end graphics applications for the SPARC platform than for the other platforms combined. The SPARCstation 2GX really is the only machine we tested that has the processing horsepower to run these kinds of applications. It can perform a task such as a 3-D solid rendering in about one-fifth the time a 486 takes to complete the same rendering because its software is so highly optimized for this type of task. Packages to look for include *Anvil-5000*, from Manufacturing and Consulting Services; *CADDS*, from Prime Computer-vision; *ConceptStation*, from Aries Technology; and *Grapak*, from Advanced Technology Center.

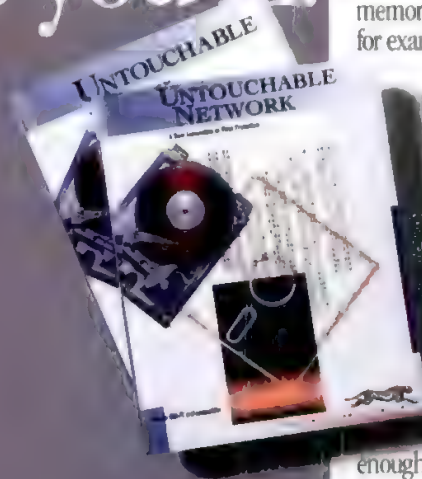
You can find high-end relational SQL (structured query language) databases (*Accell/SQL*, *Adabas*, *Ingres*, *Oracle*, and *Sybase*) on the SPARC platform, where they perform much faster than their PC and Mac counterparts.

You will also find some expensive high-performance publishing systems (*DynaText*, *FrameMaker*, *Interleaf 5*, and *Ventura Publisher*), scientific statistical programs such as *SAS*, and languages such as *Allegro Common Lisp*, *Object-Works/C++*, and *Saber-C*. You can even find specialty integrated multimedia software, such as *Clarity's Rapport*, for the Sun platform.

PC CONNECTIONS

The SPARCstation 2GX can read from and write to DOS 3.5-inch floppy disks directly, and it can run DOS software through the use of a third-party DOS emulator, such as *Insignia's SoftPC* for

Paying again and again for virus protection is enough to make you ill.



Frankly, paying anything at all is pretty nauseating.

But that's nothing compared to the feeling you get in your stomach when a drive full of data goes down the drain.

So you pay.

Then you pay again. For upgrades. Or quarterly "updates."

But even that doesn't buy you much peace of mind. Because each new day brings an average of six new viruses into the world.

Which means all anti-virus programs are inherently obsolete.

Except one.

Introducing Untouchable.™ The only software in the world that gives you 100% protection.

Today:

And tomorrow:

Like other anti-virus software, Untouchable is equipped with a TSR monitor for patrolling your system memory, plus a scanner/remover for examining the files on your disk.

Between them, these first two lines of defense can

Only Untouchable Network gives you centralized virus protection. Now you can install, monitor and control without having to leave your seat.

recognize and obliterate hundreds of the little buggers — enough to protect you from 95% of the potential carnage.

If you find that statistic reassuring, then you probably like the odds in Russian Roulette.

If you don't, you'll want to

know that Untouchable is equipped with a unique *third* line of defense, which has been mathematically proven to be, well, untouchable.

Instead of looking for viruses, this third line of defense looks for *changes in your executable and system files*.

If the change is but a single byte, Untouchable will spot it and, using our patent-pending recovery technique, reconstruct the file to its original state.

The process is known as Generic Differential Detection, and certain other programs claim to perform it, too.

But only Untouchable calculates file signatures using not one, but two proprietary algorithms that can't be reverse-engineered.

Only Untouchable guarantees 100% safe recovery of infected files. (Unlike other programs that proudly generate corrupted files, Untouchable knows when the jig is up and doesn't attempt recovery.)

Only Untouchable can provide centralized network virus protection. In fact, Untouchable Network has enough virus alerts and reporting mechanisms to settle the stomach of even the most nervous Netware® administrator.

And only Untouchable is backed by our vaunted 24-hour toll-free technical support and a one-year money-back guarantee.

If you're worried about viruses — and you should be — don't reach for the Maalox®. Reach for the phone. Dial 1-800-677-1848.

You'll feel better right away.

FIFTH GENERATION SYSTEMS, INC.

Mathematica 2.0: the standard for technical computing

"No other mathematical software package comes close to the breadth of *Mathematica's* vision of what computer mathematics should be."

PC Magazine

"The importance of the program cannot be overlooked... it so fundamentally alters the mechanics of mathematics."

New York Times

Available across PC, Macintosh, Unix, and VMS platforms, *Mathematica* includes a full range of interactive numerical, graphical, and symbolic computation capabilities, all linked to the powerful built-in *Mathematica* language. *Mathematica* 2.0 adds still more features to the proven leader in technical computing software, including sound generation and flexible external program communication.

Mathematica has rapidly become the standard for technical computing, with more than a dozen textbooks, a quarterly journal, and several newsletters devoted to the system. *Mathematica* is in use at all of the 50 largest U.S. universities, all of the technical Fortune 50 companies, and most of the world's larger engineering firms. In fact, more than 150,000 technical professionals and students around the world are working with *Mathematica* every day.

To find out what *Mathematica* can do for you, call Wolfram Research at 1-800-441-MATH.

Mathematica 2.0

A System for Doing Mathematics by Computer

Mathematica is currently available for: MS-DOS, Microsoft Windows, Macintosh, CONVEX, DG AViiON, DEC VAX/VMS, DEC RISC, HP 9000, Apollo, IBM RISC System/6000, MIPS, NeXT, Silicon Graphics, Sony, Sun-3, and SPARC-based systems.

Prices in the U.S. and Canada start at \$595.
Educational discounts and student versions are available.

Wolfram Research, Inc.
100 Trade Center Drive, Champaign, IL 61820-7237 USA
217-398-0700 fax 217-398-0747
email: info@wri.com

Wolfram Research (UK) Ltd.
P.O. Box 114, Abingdon, Oxon OX13 6TG United Kingdom
+44 (0)235 550440 fax +44 (0)235 550445
email: info-uk@wri.com

© 1992 Wolfram Research, Inc. Mathematica is a registered trademark of Wolfram Research, Inc. Mathematica is not associated with Mathematica Inc. Mathematica is a registered trademark of Wolfram Research, Inc. All other trademarks are the property of their respective owners.



COVER STORY PLATFORMS

Sun. You can also connect a SPARCstation 2GX to an Ethernet-compatible PC for networking (and for file sharing using NFS and PC-NFS). You could also use a third-party network operating system, such as *NetWare* or *AppleTalk*, to complete the Sun-PC connection, and it is possible to run *NetWare* from a DOS window on a SPARCstation.

Some PC managers may want to use a SPARCstation 2GX or SPARCserver as a centralized file or database server for their PCs. The machine we tested would also make a fine server for a group of PCs running processor-intensive 3-D graphics software—3-D rendering programs, for instance. Rather than tie up the PC with this function, you might install software such as Pixar's *RenderMan* on the PCs and SPARCstation 2GX. The SPARCstation would do most of the rendering calculations and let the PC do the drawing.

CONCLUSION

It is a mistake to evaluate a SPARCstation 2GX the same way you would evaluate a new high-end PC. Primarily, PC folk would buy a SPARC computer to run engineering and scientific applications.

Where the Sun SPARCstation 2GX really shows its Unix heritage is with the lack of general office-productivity software. There are some good ones (such as *Lotus 1-2-3*), but much of the available software is slow and does not make much sense to use (like *WordPerfect*). And compared with the average 386 and 486 platforms, there are very few such applications available for Sun systems.

But if you decide to run a Sun system for specific applications, expect to be in close touch with your dealer to optimize your hardware and software applications.



FACT FILE

Sun SPARCstation 2GX

Sun Microsystems Inc., 2550 Garcia Ave., Mountain View, CA 94043-1100; 800-821-4843, 415-960-1300.

List price (tested configuration): \$29,990.
Motherboard: SPARC 40-MHz CPU, 32MB RAM, 64K cache.

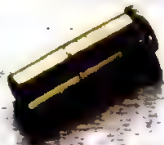
Display: 1,152-by-900 color output, Sun 76-Hz 19-inch monitor.

Storage: 1.1GB SCSI hard disk, 1.44MB floppy disk drive, Sun CD-ROM drive; Sun tape drive.

Software: Solaris 1.0 (includes SunOS 4.1.2, OpenWindows, Version 2.0).

CIRCLE 481 ON READER SERVICE CARD

**JUST WHEN
EVERYONE
THOUGHT
WE'D
TAKEN OUR
LAST
CHEAP SHOT**

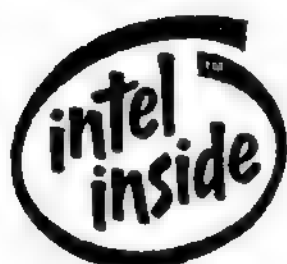


BANG.

BANG.

BANG.

BANG.



Leasing arranged by Leasing Group, Inc. Outside the U.S., configurations and prices may vary. i386, i486 and the Intel Inside Logo are trademarks of Intel Corporation. FORTUNE 500 is a registered trademark of The Time Inc. Magazine Company. MS-DOS and Microsoft are registered trademarks and



NOW \$1,799
THE DELL i325SX i386™ SX
25 MHz SYSTEM

- LEASE: \$67/MO
- 4 MB RAM
- 80 MB HARD DRIVE
- DUAL FLOPPY DRIVES
- SUPER VGA COLOR (1024 x 768) MONITOR
- MS-DOS™ 5
- MICROSOFT® WINDOWS™ 3
- MICROSOFT MOUSE



NOW \$2,199
THE DELL 486P/16 i486™ SX
16 MHz SYSTEM

- LEASE: \$82/MO
- 4 MB RAM
- 120 MB HARD DRIVE
- DUAL FLOPPY DRIVES
- SUPER VGA COLOR (1024 x 768) MONITOR
- MS-DOS 5
- MICROSOFT WINDOWS 3
- MICROSOFT MOUSE



NOW \$2,499
THE DELL 486P/25 i486SX
25 MHz SYSTEM

- LEASE: \$93/MO.
- 4 MB RAM
- 120 MB HARD DRIVE
- DUAL FLOPPY DRIVES
- ULTRASCAN 14C COLOR (1024 x 768) MONITOR
- MS-DOS 5
- MICROSOFT WINDOWS 3
- MICROSOFT MOUSE



NOW \$3,499
THE DELL 486D/50 i486DX2
(Speed Doubler) 50 MHz
SYSTEM

- LEASE: \$127/MO.
- 8 MB RAM
- 230 MB HARD DRIVE
- COMBO FLOPPY DRIVE
- ULTRASCAN 14C COLOR (1024 x 768) MONITOR
- MS-DOS 5
- MICROSOFT WINDOWS 3
- MICROSOFT MOUSE

Everybody's been hit hard by the recession.

Here's your chance to hit back.

Until May 31st, we've lowered the prices of four of our hottest bundled systems from \$128 to \$449. Which should send our competitors scrambling for their calculators and you scrambling for the phone.

But our lower prices shouldn't lower your expectations. You'll still get everything you've come to expect from Dell.

Like a service and support package that makes other guys' service seem like a shot in the dark. With toll-free technical hotlines that solve 90% of reported problems over the phone, usually in 10 minutes or less. Our innovative TechFax™ line that offers system information 24 hours a day. A trained technician that can be at your desk with a solution in hand, usually by the next business day.△ And our optional Critical Care™ plan that can get you help in four hours or less.

Which is the kind of fanatical customer service that's consistently given our competitors fits, and won the hearts and minds of customers and magazine editors across the globe. It's also helped us build an \$890 million business, turned two-thirds of the FORTUNE 500® into customers and won us 53 product awards just last year.

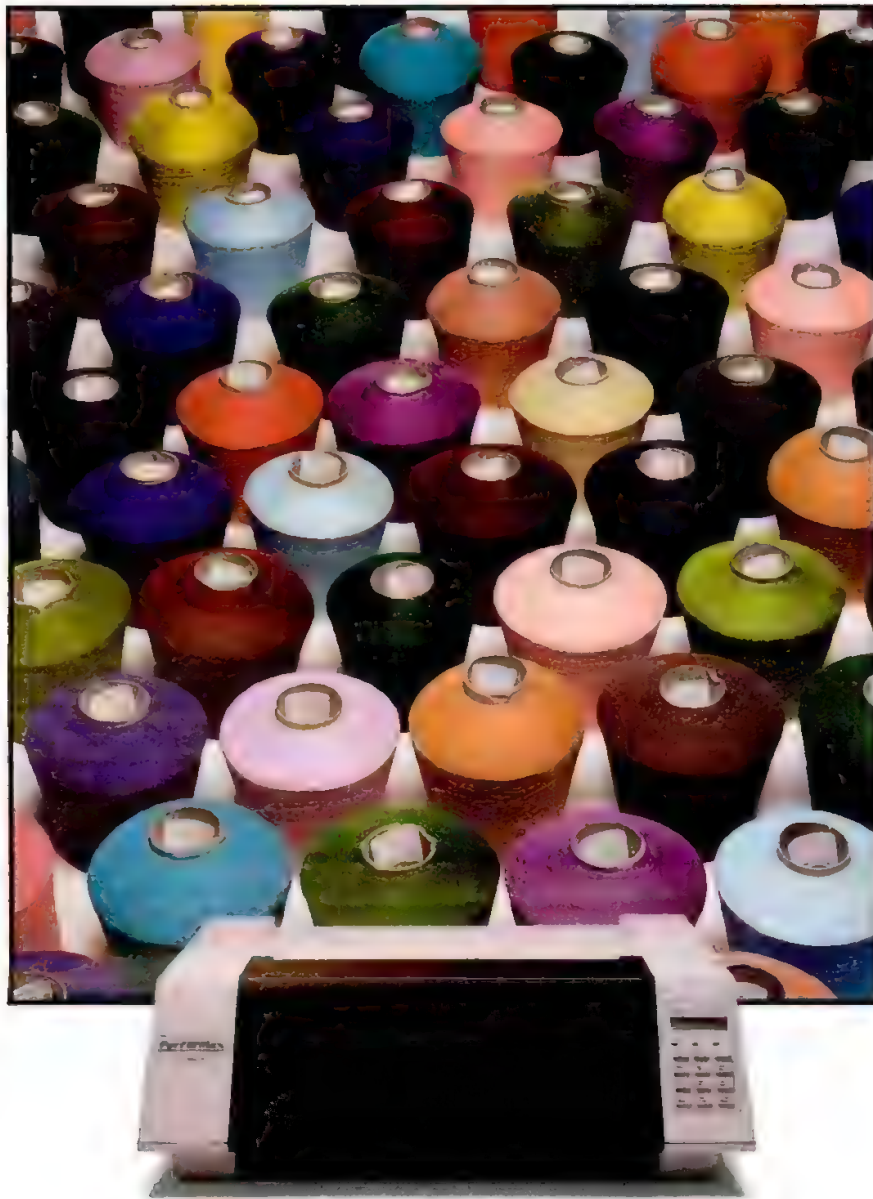
So call us today and take advantage of these special prices. Because this may be your best shot at getting so much computer for so little money.

DELL

800-247-2076

TO ORDER, CALL PLEASE REFERENCE #11BU7.
HOURS: 7AM-9PM CT MON-FRI, 8AM-4PM CT SAT, 10AM-3PM CT SUN.
IN CANADA, CALL 800-668-3071. IN MEXICO, 95-800-0664

Last Year, This Printer Made A Name For Itself 6 Million Times.



It's a dirty job, but someone has to do it: Print coded tracking labels for 18 hours a day, every day, all year round. So the folks at Spectrum Dyed Yarns, Inc. in Kings Mountain, North Carolina hired some real workaholics — two dedicated Datasouth printers. They crank out 6 million labels apiece each year. No sweat.

Datasouth has a reputation for building the most reliable forms printers around. Thanks to features like a high-powered printhead and straight paper path, they breeze through hard-to-manage media such as adhesive labels. Even in grueling, round-the-clock duty cycles. What's more, they support a variety of emulations, and even come in bar code and demand document versions.



So hang your old printer out to dry, and contact Datasouth today at **1-800-476-2120** for more information about our reliable forms printers.



Datasouth
AMERICA'S HIGH PERFORMANCE
PRINTER COMPANY

P.O. BOX 240947, Charlotte, NC 28224 • (704) 523-8500 • Fax: (704) 523-9298 • Sales: 1-800-476-2120 • Service: 1-800-476-2450

© 1992 Datasouth Computer Corporation All product or company names listed are trademarks or registered trademarks of their respective holders.

CIRCLE 171 ON READER SERVICE CARD

The NeXT Generation

NeXT combines Unix's power with the Macintosh's ease of use in an elegant, well-designed system. Here is one solution for companies that need custom applications, vertical-market solutions, and multimedia presentation tools running alongside standard productivity applications.



by M. Keith Thompson

With the NeXT platform's sleek design, striking new features, and advanced operating environment, you would think that computer users would be flocking to it in great numbers. But while some financial and educational institutions have discovered NeXT, the general public has stayed away.

NeXT suffers from the classic chicken-and-egg quandary. To woo customers, NeXT needs a wide variety of general-purpose software applications, but to woo software developers, it needs the customers. Nevertheless, NeXT, with its Unix-based operating system, NeXTstep, has begun to make inroads, and it shows where the computer industry is headed, with built-in networking, sound, and multimedia support.

PRICE AND PERFORMANCE

NeXT computers start with a 32-bit Motorola 68040 processor, accept up to 128MB of RAM, and run under the NeXTstep operating system.

All NeXT systems provide high-resolution graphics, sound, and built-in MIDI (Musical Instrument Digital Interface) capability. A Motorola 56001 digital signal processor (DSP) provides NeXT computers with built-in integrated voice,

Nov. 9, 1989 - The Berlin Wall, the world's symbolic communication barrier, crumbles under the resounding cries for freedom.

IMAGINE THERE WERE PEOPLE COUNTING COME TO THINK

Okay, so the barrier between micros and mainframes is hardly a Berlin Wall. Still, you have to admit, it hasn't exactly helped

the free flow of information. For that matter, neither have the walls between Windows[™], DOS, Mac[™] and OS/2[®].

Between LANs and hosts...different LAN topologies...whatever.

But take heart. Because as fast as the new technologies build new communications barriers, we're finding ways to help you break them down. (Just in time to keep them from giving you a breakdown of your own!)

**ONE FAMILY OF COMMUNICATIONS SOLUTIONS
FOR DOS, MAC, WINDOWS & OS/2; SYNC &
ASYNCH; WORKSTATIONS; GATEWAYS; AND
TOKEN-RING LANs - WHAT A BREAKTHROUGH!**



You see, with DCA[®], you only need one family of micro-to-mainframe software whether you're running Windows, DOS,

Mac, OS/2 or all of the above (thanks to the IRMA[™] WorkStations and DCA/Microsoft[®] Select[™] Comm Workstation). For LAN-to-host connections, you can run three

different client operating systems through the same gateway (DCA/Microsoft Select Comm Server or IRMALAN[™]/EP). There are even token-ring boards for PCs and Macs which let you change your PC architecture, cabling and

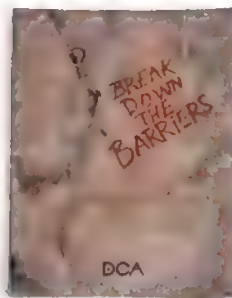
*Or call (404) 475-8380 if outside the U.S. ©1992 Digital Communications Associates, Inc. All rights reserved. DCA and CrossTalk are registered trademarks and IRMA, IRMALAN, IRMATrac, MacIRMATrac, Select and DCA Advantage are trademarks of Digital Communications Associates, Inc. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. All other brand and product names are trademarks or registered trademarks of their respective owners.

ON YOU FOR A WAY TO COMMUNICATE. OF IT, THERE ARE.

speeds without having to buy a new board (*IRMAtrac™* and *MacIRMAtrac™*). As for async communications, well, you won't find a more "award-winning" family of software than ours (*Crosstalk®*).

If you specify DCA — you won't be beating your head against the usual wall of lackluster service and support. That's because we've backed all our communications solutions with a program as inno-

vative and effective as the products themselves (*the DCA Advantage™*). With its trade-up and support offerings, every DCA purchase becomes the ultimate, "protect-your-investment" investment.



Quite simply, no one's doing more to help you overcome the differences that divide. And while the pundits may call us leaders in "communications enabling," we just like to think of it as giving you the much-needed freedom to communicate.

Whatever you call it, please call us at **1-800-348-DCA-1, ext. 10A*** and get our free guide on how to break down your communications barriers.

After all, a lot of people are counting on you for the freedom to communicate.

THE FREEDOM
TO COMMUNICATE.

DCA

Microsoft releases
new Windows

Microsoft releases
new Windows

Microsoft releases
new Windows 3.1

\$49.99 UPGRADE
Call (800) 642-7676

MI
WIN
19

COMPUTERWORKS

STREET TALKS

ALIENS STUDIED
A Y COPY OF
WINDOWS FOR
47 STRAIGHT
HOURS!!

THE DAY WINDOWS
TALKED BACK!!

WINDOWS
HE WAS A
WINDOWS
OFFERS ONE STOP
JULY 1990

ENQUIRER

WINDOW
RELEASED

The Liberty Journal
TrueType is here

Herald Monitor

IT'S MICROSOFT
WINDOWS 3.1!!

The
Independent-T
10 million co
of Windo
already shi

Your PC just got easier to use.

Introducing Micro



The Daily Monitor
WINDOWS 3.1
RELEASED!
 Easier, faster file manager

The Herald
Microsoft releases
new Windows 3.1
 Easy to install, learn and use

The upgrade you've been waiting for is fast, smart, reliable. From the express setup and on-line Tutorial to a thoughtfully redesigned File Manager, you'll see the Microsoft® Windows® operating system taken to a new level. And you'll see why your PC is so much easier to use.

The Liberty Journal
TrueType is here
 Aa

We built TrueType® scalable fonts right into the system. That means you have better looking type and better WYSIWYG, on-screen and on paper. Those sharper-looking fonts also print faster. And with all types of printers—even dot matrix printers. What could be easier?



Fact: Windows 3.1 supports object linking and embedding (OLE), which improves the way your applications work together. And multimedia support lets you embed a voice note, music or sound effects into today's Windows-based applications, as well as run advanced multimedia applications. Mind-boggling but true.

To upgrade, call (800) 642-7676.

*Special upgrade price of \$49.99 is available only through 6/1/92. Offer good for current licensees of Windows only. Limit one upgrade copy availability may vary. © 1992 Microsoft Corporation. All rights reserved. Printed in the USA. Offer good only in the 50 United States. In Canada, call (206) 936-8661. Microsoft and MS-DOS are registered trademarks and Windows and the Windows logo are trademarks of Microsoft Corporation.



One disc brings more than 1,100 programs into the light of day. At your desk. In seconds.

Introducing PC Magazine's revolutionary software showroom on a disc — the quickest, easiest way ever devised to evaluate today's hottest programs.

To make the smartest buying decisions, you need hands-on experience. Now all it takes is an IBM-compatible computer and a CD-ROM drive.

PC Magazine's Select Demos is the only single source of demos and working models of today's top DOS and Windows based software products. In over 50 application categories. From over 600 publishers.

These are the publishers' own demos, not replicas. The best of what's available. Every mainstream application where a demo exists, including PC Magazine's Editors' Choice winners and many demos not commonly available.

Everything you need to know

At the heart of Select Demos is a powerful database that lets you quickly find the programs that fit your exact needs.



Identify applications by name, company, product type, or price. Search by key words. Or browse randomly.

In addition to the actual demonstration software, Select Demos contains comprehensive profiles of every product on the disc, with complete technical specs, publisher's name and address, summary description, and more.

FREE SOFTWARE BONUS!

Three fully operational programs — \$280 value!

On your disc and ready to run *absolutely free* — **GeoWorks Ensemble 1.0**, the multitasking graphical environment for people without tons of memory. **CheckFree**,[®] your introduction to electronic bill paying. And **Smartcom EZ**, a complete communications program from Hayes.

\$50 Charter Savings

Select Demos is yours for *only* \$99* — a savings of \$50 off the regular price of \$149.

Order today 1-800-426-3475, Ext. 202

Or write to: PC Magazine's Select Demos, Dept. AB52, P.O. Box 51477, Indianapolis, IN 46251

*Please include \$5.00 for shipping and handling. Fully operational software not for resale or distribution; documentation not included. © 1992 Ziff Communications Company. All rights reserved. Select Demos and Computer Library are trademarks of Ziff Communications Company. Other brand or product names are trademarks or registered trademarks of their respective companies.

System Requirements • IBM PC/XT[™], AT[™], PS/2[™] or other fully compatible computer • 640K RAM • DOS 3.1 or higher • CD-ROM drive with CD-ROM extensions for Microsoft[®] MS-DOS[®] (Version 2.0 or higher).

sound, and music with CD-quality fidelity. The MIDI interface allows you to connect MIDI-compatible music devices such as keyboards or drums to the NeXT for recording, editing, and playback. Each NeXT computer also includes jacks for a microphone, headphones, and audio output to a stereo.

NeXT computers have 24-bit color output, but are designed to provide 4,096 colors with 16 levels of transparency (in which all or some of the pixels underneath the graphic show up on the screen) at 1,120-by-832 resolution. Additionally, a SCSI (small computer system interface) port located on the back of the computer allows you to connect SCSI hard disks, CD-ROMs, film recorders, and tape drives.

NeXT offers more than a dozen configurations. The entry-level NeXTstation contains a Motorola 25-MHz 68040 CPU, 12MB of RAM, a 105MB hard disk, and a 17-inch monochrome monitor; it sells for \$4,995. The \$6,995 NeXTstation Turbo Color starts out with a 33-MHz 68040 CPU, 16MB of RAM, and a 250MB hard disk. The \$18,610 NeXTcube uses a 33-MHz 68040 chip, 16MB of RAM, a 660MB hard disk, and a high-performance NeXTdimension video card that provides 32-bit true color—24 bits for 16.7 million colors and 8 bits for transparency. We tested a NeXTstation Turbo Color system including a 406MB hard disk, which has a list price of \$8,995. The NeXT machine ended up costing somewhat less than the Dell PowerLine 450DE, and included several features that were not part of the basic PC, such as sound and multimedia.

On PC Magazine Labs' tests, reading files from DOS into NeXTstep had mixed results. When we loaded a 100K ASCII file from a 3.5-inch DOS floppy disk to the Turbo Color, the system took 42 seconds to read the file, open *WordPerfect*, and translate the data. But when we tried to load a 1.2MB *Lotus 1-2-3* spreadsheet into *Wingz*, the operation took more than 7 minutes.

Once the programs were loaded, the Turbo Color handled most tasks quite well—particularly sorting and recalculating spreadsheets under *Wingz*, performing spell checking and search-and-replace tasks in *WordPerfect*, and flowing a 100K text file into *FrameMaker*. But the NeXT computer stumbled on the more video-intensive task of scrolling text under *WordPerfect*.

On other performance measures, NeXT

rates the NeXTstation Turbo Color at 25 mips and with a SPECmark value of 16, making the Turbo Color slower than the Dell PowerLine 450DE or the Sun SPARCstation 2GX.

WHAT MAKES THE NeXT SPECIAL

NeXTstep 2.2, a 32-bit operating system based on Mach Unix, is fully compatible with the Berkeley System Distribution version 4.3 of Unix, but not with The Santa Cruz Operation's SCO Unix System V, found on the Sun SPARCstation 2GX. Although NeXTstep features a straightforward graphical user interface (GUI), the operating system's tools for object-oriented software development differentiate NeXTstep from operating environments such as Apple's Macintosh System Software, Version 7.0 (System 7), and Sun's *OpenLook*.

This object-oriented design is apparent in every aspect of the system. The system is designed so you can easily drag and drop parts of one application into another and share tools among applications. The basic system comes with Interface Builder, one of 15 development tools geared toward programming in C and C++. Interface Builder allows you to easily create or prototype your own applications in a visual manner, by simply choosing various tools. This object-oriented design is integrated into the system, rather than added on later, as with Windows or System 7. As a result, developers claim that creating a NeXT application takes as little as one-third to one-sixth the time required to create a comparable Windows program. NeXT also bundles a variety of system administration applications with its machines.

All of these parts of the package are important because currently only about 250 applications run under the NeXTstep environment. In fact, NeXT was often the stumbling block when *PC Magazine* searched for cross-platform software. Though *WordPerfect* is available on all four platforms that we tested, few other packages are. Neither *Lotus 1-2-3* nor *Microsoft Excel*, for example, is available on NeXT; if you are looking for a cross-platform spreadsheet, you will have to choose Informix's *Wingz*.

To solve its chicken-and-egg software development dilemma, NeXT has worked hard to teach developers to create powerful, easy-to-use NeXTstep applications in

a relatively short period of time.

On the end user side, the company has focused on specific markets at a time—typically, high-profile areas, in which it can provide a few robust and easy-to-use programs. NeXT also makes sure to bundle a plethora of applications (among them the *NeXTmail* electronic-mail system and *The Original Oxford English Dictionary on Compact Disc*) for the end user.

NeXT's efforts have begun to pay off. Though the vast majority of NeXTstep applications focus on the scientific and educational markets, financial institutions have started to use NeXT computers that have been customized for that business.

The products available on NeXT are generally strong ones. *Lotus's Improv*, for example, acts like a multidimensional spreadsheet, letting you view your data in multiple views. It contains powerful tools for data analysis, incorporates both sound and graphics, and can read *Lotus 1-2-3* and other spreadsheet files. While *Lotus* plans versions for other platforms, today *Improv* is only available for the NeXT.

WordPerfect for NeXT provides NeXT users with powerful document-management features from one of the leading PC word processing programs. *Adobe Illustrator* offers robust graphics, drawing tools, and compatibility with the PC version. *Frame Technology's FrameMaker* handles desktop publishing. *NeXTmail* incorporates sound and graphics with mail messages, and represents the future of electronic communications. NeXTstep lacks a powerful CAD program, however.



Serious workstation or impressive exercise? The NeXTstation Turbo Color is loaded with cutting-edge hardware and software. Developers and customers will help decide this platform's fate.

ZEOS[®] '486

Now, You can unleash ZEOS '486 EISA

THE ZEOS '486 EISA

"ZEOS...performed best on our tests, and they offer the best overall packages."

**—PC Magazine,
Editor's Choice**

"ZEOS speeds to the head of this pack of EISA systems."

—PC Week

"The ZEOS '486 offers the best choice of all!"

—Computer Shopper

"Outstanding!"

—PC Magazine

LOTUS/WINDOWS BUNDLE!

Be Sure to ask about our Lotus 1-2-3 for Windows and Ami Pro 2.0 special Windows Bundle! Included with every ZEOS Windows package!



EISA!

Power. Editor's Choice!

"A MUST FOR THE CORPORATE USER" — PC MAGAZINE

ZEOS 486-33

ZEOS 486-25



Unleash the power! Unleash your own ZEOS '486 EISA. *PC Magazine* calls it "outstanding." If it's your first '486, you will quite likely call it unbelievable. Believe it.

In awarding your new ZEOS '486 the coveted *Editor's Choice Award*, *PC Magazine* said the ZEOS '486 EISA was "best on our tests." They went on to note the ZEOS '486 is "both surprisingly useable and affordable." But that really shouldn't come as a surprise. After all, this ZEOS '486 powerhouse comes from a family of *Eight* ZEOS Editor's Choice machines. Now let's talk real '486 power:

THE POWER OF EISA

It begins with the EISA bus. *PC Magazine* found that the 32-bit EISA bus when combined with our EISA disk caching controller will provide performance "easily twice as fast (and occasionally ten times as fast) as an AT-bus computer with the same microprocessor and megahertz rating." Now that's *fast*!

But what about compatibility? While the '486 processor offers full software compatibility, the EISA bus will accept your present eight and sixteen bit expansion cards and run them without a hitch. That's the advantage of the EISA bus. Incredible performance with complete compatibility. That's your new ZEOS '486 EISA.

"TWEAKING AND REFINING" A ZEOS HALLMARK.

And, speaking of performance. In their *Editor's Choice* review, *PC Magazine* noted "ZEOS has a reputation for tweaking and refining that shows." That's the ZEOS way.

Attention to detail really makes the difference. We're talking about important details, items you may not even notice at first. Like two cooling fans in EVERY ZEOS '486. And cabinets *Loaded* with drive bays. Loaded too with 300 Watts of power and a motherboard that will take up to 32MB *right on board*. And more.

"SUPERLATIVE SERVICE AND SUPPORT"

"Superlative Service and Support." That's what *PC Magazine* calls ZEOS' 24 Hour a Day Toll Free Sales and Technical Support program. We're here any time you need us—day or night.

And that's only the start of your ZEOS Customer Satisfaction package. Add to it our 30 Day Absolute Satisfaction Money Back Guarantee, One Full Year Limited Warranty and our Express Parts Replacement Policy. You're going to be very satisfied. We don't just say it. *We Guarantee It!*

ORDER YOUR ZEOS '486 EISA TODAY!

PC Magazine says the ZEOS '486 is "a must for the corporate user." Corporate or otherwise, the *ZEOS Editor's Choice* '486 EISA is the one for you. So why not pick up the phone and give us a call right now? Your own expert Systems Consultant is waiting here to help you tailor your new ZEOS '486 EISA just as you want it. Your absolute satisfaction is *Guaranteed!*

CALL NOW TOLL FREE

800-423-5891

DON'T FORGET THE OPTIONS!

ZEOS has them all. Starting with blazing 32-bit EISA cards and every other high performance option you could possibly want. On-site service is available too. Call 800-423-5891 for details.



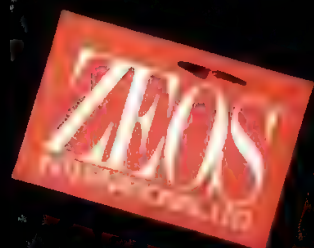
**THE COMPLETE
ZEOS '486-33MHz
EISA DESKTOP!
128K CACHE, 85MB
DRIVE & MORE.**

ONLY \$2795

- '486-33MHz CPU with built-in Cache and Math Coprocessor.
- High Speed 128K SRAM Secondary Cache.
- 8-32 EISA expansion slots. Also accepts 8-bit and 16-bit cards.
- 1MB of High Speed RAM, expandable to a Total of 32MB.
- Ultra Fast 107MB IDE Hard Drive, Teac® 1.2MB Floppy Drive.
- Genuine Hercules® brand graphics controller. 14" High-Res Amber Display with Tilt/Swivel base.
- ZEOS/RS 101 key Space Saver Keyboard.
- ZEOS I/O Card with Two High Speed Serial plus Parallel & Game port.
- Full Weitek® math coprocessor support.
- Rugged ZEOS 7-bay desktop case with 300 Watt Power Supply and two cooling fans for increased component life and system expandability.
- Wrap it all up with 24 Hour a Day, 365 Day per Year Toll Free Technical and Sales Support on your ZEOS Hotline. You've got a winner!

ORDER NOW TOLL FREE
800-423-5891

FAX Orders Dial: 612-633-1325
TDD (Hearing Impaired) Orders
Call: 800-228-5389
Outside US and Canada Call:
612-633-6131
MasterCard, VISA,
Discover, Am Exp.
Z-CARD and COD.
GSA# G5A00K91AG35176
Open 24 Hours a Day,
365 Days a year!



Purchase orders from Fortune 1000 companies, governments and institutions subject to approval. Leasing programs available. All prices and specifications subject to change without notice. Please call to confirm pricing, specification and warranty details. The following are trademarks of their respective corporations: ZEOS and Z-Card of ZEOS International Ltd. © ZEOS International Ltd., 530 5th Avenue, N.W., St. Paul, MN 55112 USA. ZEOS is a publicly traded company. NASDAQ symbol: ZEOS

INTRODUCING PC SOUND

THAT REALLY GETS AROUND.

Announcing Audioport™ from Media Vision. A high performance audio device for PCs on the go.

Now take PC sound beyond the city limits. And the limits of your imagination. With Audioport — an innovative way to bring the power of sound to your PC — anywhere.

With Audioport's unique design and proprietary Transportable Sound™ technology, it can be carried from computer to computer. And installed on any IBM PC/AT, PS/2 or Notebook machine with a parallel port.

It's mobile. It's mini. It's easy as a mouse.

Now you don't have to open your PC for PC sound. In fact, if you can connect a mouse, you can connect Audioport. Just plug it in. Also, it's so light-weight and compact it actually fits into your shirt pocket.

Yet it's power packed. With its high quality built-in speaker, inputs for headset or external speakers, FM synthesis capability — plus support for Windows 3.1™ and Lotus

Sound™ — you'll be able to do it all. Like take advantage of the many business, entertainment, educational and multimedia applications on the market today.

And, it comes bundled with many useful software applications. Including Lotus Sound and Pocket Recorder™ — two Windows applications that allow you to record and play digitized sound. SB2AP™ — a TSR program that provides AdLib™ and Sound Blaster™ compatibility on 386SX and higher featured computers. In addition, At Your Service™ — an animated, talking calendar for Windows Graphical Environment with Multimedia Extensions 1.0.

Hit the road with AC/DC. And more.

Because Audioport is battery powered, you'll get miles and miles of sound. It operates either on 4 AAA batteries, or a +6V battery eliminator for extended use. And, of course, the AC power adapter is included.

Plus, Audioport has made all this PC portability and ease easy to afford. So call 1-800-845-5870 now. And experience incredible PC sound. Wherever you go.



MEDIA VISION

Media Vision, 47221 Fremont Blvd., Fremont, CA 94538. 510-770-8600, FAX: 510-770-9592
Audioport, Transportable Sound, and Media Vision are trademarks of Media Vision, Inc. All other trademarks and registered trademarks are owned by their respective companies. © 1992, Media Vision, Inc.

CIRCLE 093 ON READER SERVICE CARD

PC CONNECTIONS

On our tests, we found that the NeXTstation provides simple but not always quick integration with the PC. NeXTstation supports industry standards, using TIFF, EPS, and JPEG formats to store information. The NeXTstation also recognizes DOS floppy disks without the need for conversion utilities such as Sun's DOS2-UNIX or the Mac's Apple File Exchange.

Most products that operate on multiple platforms, such as *Adobe Illustrator*, *FrameMaker*, *WordPerfect*, and *Wingz*, store files in a format independent of the operating system. Thus, data can be transferred from machine to machine without any conversions. For example, when retrieving a *WordPerfect* file from a DOS floppy disk, you simply choose the file from the file browser.

Each NeXT computer includes an Ethernet interface on the motherboard and both a BNC and a 10BaseT connector to attach to the Ethernet. (Software in the NeXT determines which connector you are using.)

STRENGTHS AND WEAKNESSES

You are not likely to use a NeXT computer as a dedicated server because it is more cost effective to run Unix on a less expensive computer. NeXTstep's strength is its user interface. But you can easily share the resources on your NeXTstation with Unix's built-in support for NFS (Network File System) and TCP/IP (Transmission Control Protocol/Internet Protocol), two protocols for sharing files on a network of dissimilar computers.

Although NeXT computers can serve as clients on any NFS or TCP/IP network without fuss, *NetWare* connectivity comes at a price.

Currently, the only way to connect a NeXT computer to a *NetWare* file server

COMPARISON PLATFORMS			
Suitability to Task			
NeXTstation Turbo Color			
Applications integration			
Engineering and science			
High-end graphics			
Office productivity			
PC connectivity			

is with *NetWare* NFS, a \$4,995 option on a *NetWare* server. Once *NetWare* NFS is running, connecting to the *NetWare* server is simple because the *NetWare* server looks like just another Unix computer. Additionally, once connected to the *NetWare* server, users on all platforms can share data easily.

While NeXT has announced built-in support for Novell's *NetWare* 2.2 and 3.11 and said it will support Macintosh connectivity in Version 3.0 of NeXTstep (scheduled for release later this year), today the product does not work as seamlessly with *NetWare* or with the Macintosh as other platforms do.

CONCLUSION

The NeXT platform has a lot of potential, but much of that potential remains untapped. Its object-oriented design should make NeXT a good platform for software development, though it has yet to find the widespread support of software companies or applications developers. The NeXT platform has sound and multimedia capabilities that are equal to or ahead of most of its competitors, yet we have not seen as many multimedia applications for the NeXT as we have for the Macintosh or for Windows.

Yet the platform's capabilities remain quite attractive, and it will be interesting to see whether NeXT can gain more support. To do this, NeXT plans to enhance its own machines and ship NeXTstep 3.0 for a variety of 486-based PCs. No matter how good the underlying system, applications determine how much use you will get out of a particular platform.

RETAILERS: DEAL YOURSELF IN



GET A FULL HOUSE OF CUSTOMERS—STOCK THE ZIFF-DAVIS COMPUTER LINE

You're playing a winning hand when you carry the Ziff-Davis line of computer magazines:

PC MAGAZINE
PC/COMPUTING
COMPUTER SHOPPER
MACUSER.

Here's your choice to build traffic. Establish your store as a full-service center. And best of all, boost sales of your inventory, while earning additional profits.

Plus—we make it easy for you to get the maximum profit from our line. You get *guaranteed* profits. Free in-store sales aids. A toll-free HELP line. And much, much more!

So follow the leader to big profits! To stock the magazines that move your stock, call:

1-800-435-5003

Or write: Frank Manzano,
Ziff-Davis Publishing,
One Park Ave. - 5th Floor,
New York, NY 10016



NeXTstation Turbo Color

NeXT Computer Inc., 900 Chesapeake Dr.,
Redwood City, CA 94063; 800-879-6398, 415-
366-0900; fax, 510-438-4331.

List price (tested configuration): \$8,995.

Motherboard: Motorola 33-MHz 68040 CPU,
16MB RAM, 8K cache.

Display: 1,120-by-832 16-bit color output,
256K video RAM; NeXT 68-Hz 17-inch color
monitor.

Storage: 406MB SCSI-II hard disk, 2.8MB
3.5-inch floppy disk drive.

Software: NeXTstep, Release 2.2.

CIRCLE 492 ON READER SERVICE CARD

INVAR SHADOW MASK
FOR SHARP, CRISP
IMAGES THAT'S 30%
BRIGHTER THAN
MONITORS WITH
CONVENTIONAL MASKS

15" FST AND EDGE-TO-
EDGE OVERSCAN FOR
UP TO 36% MORE
DISPLAY AREA

BUILT-IN
MICROPROCESSOR FOR
AUTOMATIC SIZE AND
PHASE CONFIGURATION
OF VIRTUALLY ALL VIDEO
MODES

MX15F. THE ULTIMATE WINDOWS DISPLAY



WINNER OF
PC MAGAZINE
EDITORS' CHOICE
AND PC WORLD
BEST BUY



IDEAL COMPANION FOR
WINDOWS ACCELERATOR
BOARDS SUCH AS ATI
GRAPHICS ULTRA,
DIAMOND STEALTH AND
ORCHID FAHRENHEIT.
THEY PROVIDE THE
ACCELERATION, MX15F
PROVIDES THE ROOM
TO VROOM.

SUPPORTS NON-
INTERLACED HIGH
RESOLUTION AT HIGHEST
REFRESH (1024 x 768
AT 70/72/76 HZ) FOR
TRULY FLICKER-FREE
DISPLAY AND REDUCED
EYE STRAIN

HIGH-RESOLUTION UP TO
1280 x 1024 NON-
INTERLACED FOR MORE
WINDOWS WORK SPACE

For more information, call us now at 1-800-827-3998, or contact us at our corporate headquarters:
4392 Corporate Center Drive, Los Alamitos, CA 90720. Tel: 714/827-3998. Fax: 714/827-5522.

© 1992 MAG Innovision, Inc. All companies and/or product names are trademarks of their respective owners.

MAG
INNOVISION



PCs: A Matter of Choice

Don't worry: You have chosen the right computer. No other platform has the widespread acceptance, the vast library of software, or the affordability of the Intel-based PC.

by Julie Cohen

While the other platforms we've looked at all have their strengths, nothing beats the PC for general business applications and overall value. The Intel platform offers breadth and depth of software, vast range of performance and price, and affordability that no other platform can claim.

PRICE AND PERFORMANCE

Among all computer platforms, the PC provides the most performance for the fewest dollars. With so much standardization of components, many of the hundreds of retail and mail-order vendors compete heavily on price. You can choose your comfort level of performance, quality, and service and support depending on how much you want to spend.

Compatible PCs range from the old 8088 and 80286 platforms to today's 80386- and 80486-based machines. Even at the top of the line, you can find quite a range. You could buy a \$14,000 list price Compaq Deskpro 486/50L with 8MB of RAM, a 340MB hard disk, and 1,024-by-768 color display. Or you could step down to a \$5,800 33-MHz 486 from a company such as Gateway, with much of the functionality you would expect from Compaq, if not the research and development and technical leadership. In contrast, there are no inexpensive Mac-compatible or NeXT-compatible computers from other companies, and very few SPARC clones.



EPS HAS ESP WHEN IT COMES TO

EPS Technologies

When you choose EPS, you're making a lot of smart decisions.

Your EPS computer arrives fully loaded and ready to run. DOS 5.0 and Windows 3.0 are included right on the MAXTOR hard drive.

You know about the memory management capabilities of DOS and Windows—here's a system that actually comes with some memory to manage! Your EPS system has 4Mb of zero wait state RAM—twice as much as our competitors offer. You'll never have to scrounge for SIMMs again!

And no need to put up with one of those fidgety 200dpi mice—your EPS system comes with an award-winning Logitech 400-dpi 3-button mouse. Perfect for all of your Windows applications.

Potential Let's face it—it only takes one corner-cutting component to drag down the whole system. That's why at EPS, quality is built-in right from the start. Our custom-made motherboards provide the basis for more powerful, graphics-oriented systems with greater expansion options.

Vision Many companies keep their prices down by shipping run-of-the-mill displays with their systems. But EPS gives you quality you don't have to pay extra for. Our Non-interlaced Super VGA Monitors are backed up by 65,000-color cards that pack one full megabyte of video RAM. They're available now—and they're standard! And to take advantage of all this video power, we include accelerated drivers for Windows, and Panacea display drivers for AutoCad.

Drive Our drives will never let you down. The TEAC 1.2 and 1.44Mb floppy drives are the best in the industry. And our MAXTOR IDE hard drives are built to last not 30,000 hours, not 50,000 hours, but a whopping 150,000 hours. Whether your EPS system is a desktop model; or on a server, this means safe data, with no surprises.

We set high standards for all of our standard configurations Most computers have performance ceilings you can hit the first week. Don't put up with the headaches of low-clearance machines—let EPS take you to new heights with room to spare!

"All systems arrived in perfect condition, with software loaded (saving my staff nearly a hundred man hours). I sincerely applaud your organization and its ability to build a quality product, at a competitive price, and deliver on time."

Col. Otto Murry IV
US Army



EPS 386SX-25MHz \$1545

- AMD 80386/SX-25 MHz Microprocessor
- 4 Meg 0 Wait State RAM Expandable to 8 Meg
- Desktop Case/200 Watt Power Supply
- Socketed for 80387 Co Processor
- AMI BIOS/Clock Calendar
- 2 Ser./1 Par./1 Game Port
- TEAC 1.2 and 1.44 MB Floppy Drives
- MAXTOR 80 Meg IDE HD (17 MS) (150,000 hr. MTBF)
- Systems User's Manual
- 101 Keyboard
- EPS Non-Interlaced 14" Color Monitor 1024x768 SVGA .28 Dot Pitch
- 1 Meg SVGA Card 1024x768 w/Sierra DAC chip (1 Meg for 256 Colors at 1024x768) (1 Meg for 65,536 Colors at 800x600)
- MS Windows 3.0 w/Logitech 3-Button, 400DPI Mouse
- MS DOS 5.0
- One Year Warranty/On-Site Service
- 60 Day Money Back Guarantee
- Call for Customizing Options

At EPS, we believe in a simple philosophy:
"Anticipate the customer's needs and use only the best components."

EPS Exclusive!

- EPS 15" Non-Interlaced Color Monitor 1024x768 SVGA .28 Dot Pitch
 - and
 - "Lightning" Fast Co-Processor SVGA card 1 Meg VRAM for up to 65,536 colors
- add to any system for:
- \$250**

GSA Contracts
#GS00K91AGS5035OPT1

Order Toll-Free
1-800-447-0921
Tech Hot Line
1-800-526-4258
FAX Orders
1-605-966-5482

EPS Technologies
"a tradition of value and performance"

EPS Technologies, Inc.
10089 Dakota Avenue
P.O. Box 278
Jefferson, SD 57038
605-966-5588

MEETING YOUR COMPUTER NEEDS.



EPS 386-33MHz \$1795

- INTEL 80386/33 MHz Microprocessor
- 4 Meg 0 Wait State RAM Expandable to 32 Meg
- 128K Cache (25NS)
- Desktop Case/200 Watt Power Supply
- Socketed for 80387 or Weitek Co Processors
- AMI BIOS/Clock Calendar
- 2 Ser./1 Par./1 Game Port
- TEAC 1.2 and 1.44 MB Floppy Drives
- MAXTOR 130 Meg IDE HD (15 MS) (150,000 hr. MTBF)
- 101 Keyboard
- EPS Non-Interlaced 14" Color Monitor 1024x768 SVGA .28
- 1 Meg SVGA Card 1024x768 w/Sierra DAC chip (1 Meg for 256 Colors at 1024x768) (1 Meg for 65,536 Colors at 800x600)
- MS Windows 3.0 w/Logitech 3-Button, 400DPI Mouse
- MS DOS 5.0
- Systems User's Manual
- One Year Warranty/ On-Site Service
- 60 Day Money Back Guarantee
- Call for Customizing Options



EPS 486-33MHz \$2495

- INTEL 80486/33 MHz Microprocessor
- 4 Meg 0 Wait State RAM Expandable to 64 Meg
- 256K Cache (25NS)
- Tower Case/220 Watt Power Supply
- AMI BIOS/Clock Calendar
- 2 Ser./1 Par./1 Game Port
- TEAC 1.2 and 1.44 MB Floppy Drives
- MAXTOR 213 Meg IDE HD (15 MS) (150,000 hr. MTBF)
- 101 Keyboard
- EPS Non-Interlaced 14" Color Monitor 1024x768 SVGA .28
- 1 Meg SVGA Card 1024x768 w/Sierra DAC chip (1 Meg for 256 Colors at 1024x768) (1 Meg for 65,536 Colors at 800x600)
- MS Windows 3.0 w/Logitech 3-Button, 400DPI Mouse
- MS DOS 5.0
- Systems User's Manual
- One Year Warranty/ On-Site Service
- 60 Day Money Back Guarantee
- Call for Customizing Options

EPS 386-40MHz \$1845

Same configuration as above except with true AMD 386-40 MHz CPU and 128K maximum Cache.

EPS EISA 486-33 \$3795

Same configuration as above except with EISA motherboard and 128k Cache (expandable to 256k), 340 Meg MAXTOR (15MS) SCSI Hard Drive, and ULTRASTOR 24F SCSI 32-bit EISA Controller Card.

The Critic's Corner:



"The EPS 386-33 is a machine that is bursting with promise."



"There's been no skimping on the quality of components."

COMPUTER MONTHLY

"EPS is as strong an organization as they are smart."

COMPUTER MONTHLY

"EPS has taken a simple design and improved on its performance, reliability and value."



"Service and support are what give EPS an edge over much of the competition."



"With all these advantages, it's hard to find a 33 MHz 486 based computer that will give you a better value."

Call today and purchase your EPS system in the following ways
Purchase Orders upon approval

GSA Contracts

#GS00K91AGS5035OPTI



1-800-447-0921

All brands and product names mentioned are trademarks of their respective holders. Prices are subject to change due to the volatility of the market. 80386 and 80486 are trademarks of INTEL.

In this review, we chose the Dell PowerLine 450DE as a representative sample of what the PC platform has to offer; Dell's machines typically offer a good blend of price and performance. This machine has a 50-MHz 486 processor, 16MB of RAM, a 330MB ESDI (enhanced small device interface) hard disk, an ATI Ultra graphics board with 1024-by-768 video output, and a 15-inch VGA color monitor. This configuration has a list price of \$9,275. That is in the same range as similarly configured Mac Quadras and NeXTstations, though each platform has a slightly different mix of features and configurations.

Today's fastest PCs, such as the PowerLine 450DE we tested, run more than 30 times as fast as the original IBM PC or XT, and 12 times as fast as an AT-class PC. Even more speed and power are waiting in the wings: Intel's next generation 80586 chip promises 100 mips (million instructions per second), and 32-bit operating systems such as Windows NT will finally let software developers create more robust packages.

In our word processing tests, scrolling from top to bottom of a 100K file took 20 seconds for the PowerLine 450DE—less than a quarter of the time it took even the Apple Macintosh Quadra 700 to perform the same function. The other machines were even slower. Only in areas that involve processor activity, such as spreadsheet recalculations and sorts, did other platforms beat or compete with the PC.

WHAT MAKES THE PC SPECIAL

The PC's software advantage lies in the sheer quantity of available programs. You simply would not buy a NeXTstation Turbo Color or a Sun SPARCstation 2GX for running word processing programs or spreadsheet packages, and there is a deeper selection of programs for the PC than for the Mac. Graphics software used to come to the Mac 18 to 24 months before it reached the PC; now releases happen nearly simultaneously. With the success of Microsoft Windows 3.0 (and now 3.1) and the advent of ultrafast, affordable video hardware, the PC is no longer a 97-pound weakling when it comes to graph-

ics. PCs also get more graphics programs sooner because of the relative size of the two markets; a software publisher can make the same amount of money by capturing 10 percent of the Mac market or by capturing 1 percent of the PC market.

When it comes to custom applications and vertical applications, the PC is miles ahead of any of the other platforms. Whether it is a breeding and bloodlines program for kennel owners, dental practice management, or a General Ledger program for a carnival sideshow, you are far more likely to find what you need—and to find consultants who can install and support it—on the PC platform.

CONNECTIVITY

In some respects, computers from Apple, NeXT, and Sun connect with their own kind better than the PC does, especially since network support is incorporated on the motherboard and in the operating systems. But when it comes to connecting other computers to the PC, the simplest connection is still another PC.

Of course, the PC can read its own files quite well, although there are still some problems with multiple floppy disk standards: namely, a 5.25-inch floppy disk does not fit into a 3.5-inch drive.

On the network side, the PC offers users many choices, ranging from peer-to-peer networks to server-based networks running *NetWare*, *VINES*, or *LAN Manager* on Ethernet or Token-Ring. (For more information on LAN options, see "Connectivity Simplified: An Introduction to the Ways of Networking," in the March 31, 1992, issue of *PC Magazine*.) This range of choices is far broader than that available for any other platform.

On the other hand, networking is not as simple on the PC as it is on the other platforms. But that's changing in the following ways:

■ **Shrink-wrap LANs.** Vendors have set out to make PC connectivity as painless as possible, by introducing—and supporting—so-called shrink-wrap LANs: file servers with a preinstalled

network operating system, network cards for the server and PCs, and cabling. Most important, by buying everything from one source, whether a mail-order vendor, consultant, or local dealer, the buyer gets single-source accountability. When something goes wrong, there is no finger pointing among multiple sellers.

■ **Built-in network support.** Apple and Sun already build various levels of network support into their systems; now Microsoft has promised to bring some connectivity to Windows, and Novell has promised to improve network support for DR DOS 6.0. There was also a push to move network circuitry onto the PC motherboard, but it has stalled. An Ethernet-only motherboard solution might add as little as \$50 to the cost of a PC, but PC makers fear losing sales from businesses running Token-Ring networks. Conversely, vendors say that a combination Token-Ring and Ethernet chip set might push up the cost of a PC more than \$150 (the price of an Ethernet-only network card).

■ **Cross-platform connectivity.** Connecting a Mac, NeXT, or SPARC-based computer is becoming easier. Novell's *NetWare* NFS for instance, contains *NetWare* Loadable Modules (NLMs) that let other platforms access DOS files and use the *NetWare* file server, print services, and other related functions. The service is still only one-way: The non-DOS machine can access DOS files from the server, but only the file server, not the client PCs, can access the Unix and Mac files. (For more information on connecting PCs to



There is a reason Intel-based computers dominate the market: PCs, such as the Dell PowerLine 450DE, represent the greatest value and have a wider selection of hardware and software than any other platform.

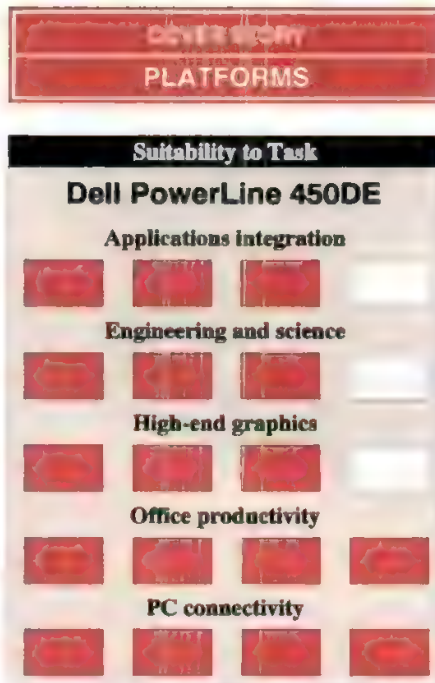
Macintoshes, see the related connectivity story, "Across the Great Divide: PC-to-Mac Connections," in this issue.)

CONCLUSION

Of the five tasks we chose for measuring the abilities of each platform, we rate the PC highest in office productivity due to the huge range of applications and the great speed the 50-MHz 486 showed on most of our tests. The PC also has better PC connectivity than any other platform (since, of course, it runs PC applications natively), although network connectivity could still be easier on PCs.

In other areas, the PC did well, but other platforms showed their strengths. In high-end graphics and multimedia, Apple was always on the multimedia forefront, and NeXT has taken a similar leadership position. Here the PC is playing catch-up. Microsoft is already shipping its Microsoft Windows with Multimedia Extensions 1.0 for use with Windows, and PC manufacturers have begun shipping multimedia-capable systems with CD-ROM and sound cards built in. But the integration of multimedia and graphics capabilities on the PC is not quite up to the standards Apple and NeXT have set.

In applications integration, the PC is also playing catch-up. Over the past two years, the PC has made big strides in ease of use and applications integration, thanks largely to Windows 3.0 and now 3.1. Windows has a long way to go to catch up to Macintosh System Software, Version 7.0, but the gap is narrowing quickly. With both operating environments, once you learn how to use one program, you know the basics—such as opening files, printing, and getting help—for all pro-



grams. With dynamic data exchange (DDE) and object linking and embedding (OLE), PC applications can link data in much the same way as with Apple's Publish and Subscribe functions, although without the Mac's network capabilities.

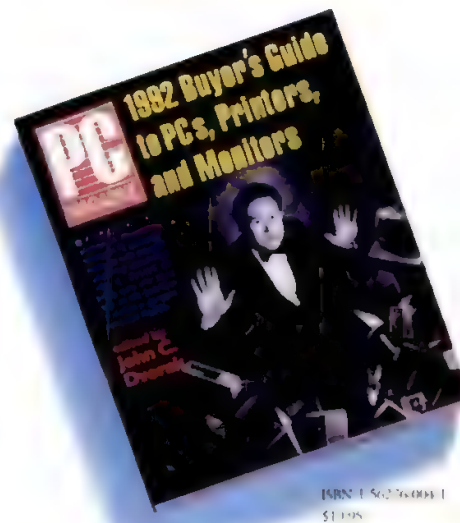
The PC platform still does not have the speed of a SPARC for certain engineering and CAD applications. It is missing some super desktop publishing and graphics packages, such as the Mac platform's *QuarkXPress* and the multiplatform *FrameMaker*—though both were due to ship this year.

The Apple Macintosh excels at graphics and desktop publishing; the Sun platform, with its SPARC processors, is a stand-out at high-end engineering and CAD; and the NeXT platform, designed as a powerful development platform, also exceeds the PC's fledgling multimedia abilities. What the PC does best is not as colorful. Still, most people buy PCs for basic business applications, and the PC's strength in that area is the reason that no competing platform has much more than 10 percent of the market.

As operating systems such as Windows NT, Taligent, and NeXTstep become available on the Intel platform, more and more effort is being placed on connecting PCs to computers from Apple, NeXT, and Sun.

What, then, is the ideal platform of the future? Perhaps the chip inside won't matter. If the platform runs the largest body of software and provides the graphical, multimedia, and applications integration features people want, it will be the platform of choice.

Dvorak Takes A Hard Look At Hardware.



This is the most exhaustive evaluation of computer hardware ever assembled. World-famous computer columnist John C. Dvorak guides you through years of accumulated data from PC Magazine Labs, one of the most respected product-testing centers in the computer industry. Whether you're shopping for a complete system or adding on, you won't find a more valuable reference anywhere.

1-800-688-0448



© 1991 Ziff-Davis Press
5903 Christie Avenue
Emeryville, CA 94608

FACT FILE

Dell PowerLine 450DE

Dell Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759; 800-289-3355, 512-338-4400; fax, 512-338-8700.

List price (tested configuration): \$9,275.

Motherboard: Intel 50-MHz 80486 CPU, 16MB RAM, 128K cache.

Storage: 330MB ESDI hard disk, UltraStor EISA controller with 4MB cache, 1.2MB and 1.44MB floppy disk drives.

Display: 1,024-by-768 ATI Ultra graphics accelerator board with 1MB RAM, 68-Hz 15-inch Dell VGA color monitor.

Software: DOS 5.0, Microsoft Windows 3.0.

Get Turbo-Charged



and get your chance to win!

Register for hot prizes in the Get Turbo-Charged Value Sweepstakes.



The Grand Prize includes the incredible new TI microLaser™ Turbo, PLUS...



Grand Prize winner also gets a choice between the TI TravelMate™ 3000 WinSX™ or Apple Macintosh IIsx® PLUS...



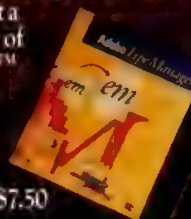
Over \$2,000 worth of publishing software: Adobe® Illustrator™, Corel Draw® and Aldus® PageMaker®!

Now between April 1, and June 30, 1992, when you see your TI dealer for a demo of the new microLaser Turbo or microLaser XL Turbo, you can register in the Get Turbo-Charged Value Sweepstakes. There's no purchase necessary.

The lucky Grand Prize winner drives off with a TI microLaser Turbo printer and a choice of the hottest computers on the market — the award-winning TI TravelMate 3000 WinSX or the Apple Macintosh IIsx — together with three of the most popular desktop publishing software packages, Aldus PageMaker, Adobe Illustrator and Corel Draw.

Coming in second looks pretty hot, too. The Second Prize winner can choose between the TI TravelMate 3000 WinSX or the Apple Macintosh IIsx.

After your test drive, if you buy a TI microLaser Turbo or microLaser XL Turbo loaded with PostScript® software from Adobe, you'll get a coupon for a free copy of Adobe Type Manager™ (ATM) software and Adobe Garamond Font Package! That's a total retail value of \$346 — you pay just a \$7.50



shipping and handling charge. Proving that you're always a winner when you choose TI.

Your dealer has all the details on the Get Turbo-Charged Value Sweepstakes. So sprint in today to see the best value in super-fast PostScript printing race through graphics software faster than other printers. And get your chance to win.

For the name of your nearest TI dealer, dial:

1-800-527-3500

TEXAS INSTRUMENTS



The Grand Prize has an approximate retail value of \$8,350. Second Prize has an approximate retail value of \$4,000. Promotion will be supported by all participating dealers in the U.S. and Canada. Void in Quebec. Canadian residents must correctly answer a skill-testing question to win. In Ohio or Michigan, you may also call 1-800-527-3500 for an entry form. microLaser, TravelMate and WinSX are trademarks of Texas Instruments Incorporated. Apple Macintosh IIsx is a registered trademark of Apple Computer, Inc. Adobe, PostScript and the PostScript logo are registered trademarks and Adobe Type Manager and Adobe Illustrator are trademarks of Adobe Systems Incorporated. Aldus and PageMaker are registered trademarks of Aldus Corporation. Corel Draw is a property of Corel Systems Corporation.

ACROSS THE GREAT DIVIDE



PC-to-Mac Connections

By Jeffrey L. Carroll and David Greenfield

If you think PCs and Macs are separate islands, think again. Necessity has brought together these once bitter enemies. In this set of stories, we will tell you the best solutions for tying PCs and Macs together.

Thanks to a wealth of mature products, weaving the yin and yang of the personal computer industry into a cohesive network has become a relatively simple task. Whether you need to swap or share files among PCs and Macintoshes, there are many solutions available. Over the past year alone, the three leading network operating system vendors, Microsoft, Novell, and Banyan Systems, have enhanced their Macintosh support.

This improved network support has happened for good reason. Increasingly, corporations are becoming the playing fields for both PCs and Macs. In a recent survey of *PC Magazine* subscribers, nearly a quarter of the respondents reported that

their corporations had both PCs and Macs installed.

In theory, picking the right solution should be easy. Identify your tasks and pick the products best suited for them. If file transfer is all you need, then just swap disks (Macs can read PC disks). For tighter PC-to-Mac integration on existing large-scale network operating systems, use the Mac options available for *LAN Manager*, *NetWare*, and *VINES*. (For more information, see the diagram "Navigating the PC-to-Mac Minefield.")

To make your connectivity decisions easier, we have packaged together a group of articles that provide specific advice on all aspects of PC-to-Mac connectivity. But given the scope of these articles, we did not award an Editors' Choice.

In "PC-to-Mac File Exchange: A Range of Approaches," John Rizzo details the options for low-cost PC-to-Mac connectivity. Need to swap disks with a Mac or cable-connect your PC to a Macintosh? We will tell you the products that you will need.

HIGHLIGHTS

- Macintoshes are gaining visibility in the corporate environment. In a recent survey of *PC Magazine's* readers, nearly 25 percent of the respondents noted that they currently have PCs and Macs in their organizations.
- Floppy disks are probably the easiest way to share data between PCs and Macs. Most Macs can read and write to DOS and OS/2 formats.
- Low-cost LANs such as *TOPS* and *PhoneNET Talk* are great for connecting PCs and Macs. But when tight security or a robust platform for client/server applications is needed, look at the Mac options available with *LAN Manager*, *NetWare*, and *VINES*.
- You can move files between a PC and a Mac across a remote line with a number of communications products, including *LapLink Mac*, *MacLinkPlus/PC*, *Microphone II*, *RunPC*, *White Knight Telecommunications Software*, and *Zterm*.
- AppleTalk gateways let you connect existing AppleTalk workgroups to PC networks.
- Storing data as ASCII files is a simple way of moving text information be-

If you need more sophisticated connectivity, turn to Les Freed's story on network operating system support for Macintoshes, "High-End PC-to-Macintosh LAN Solutions." Freed analyzes the administration and interconnection capabilities of *LAN Manager Services for Macintosh*, *NetWare for Macintosh*, and *VINES Option for Macintosh*.

For PC users just getting oriented with the Macintosh, four sidebars outline the basics of PC-to-Mac connectivity. In "AppleTalk and the OSI Model," we explain how the Mac's protocol suite can interoperate with other protocols on your PC network. "System 7: Mac File Sharing for PC Users" discusses the latest version of the Macintosh operating system and its built-in hooks for PC users. In "A Macintosh Glossary for PC Partisans," Freed offers a handy guide to frequently used Macintosh terms. And in "Naming Names: The Mac File Format," he explains the differences between PC

and Macs. But this method has two problems. First, all formatting codes are lost. Second, due to differences between the ways that PCs and Macs define ASCII, some upper ASCII characters, such as bullets and apostrophes, may not make the trip between PC and Mac.

■ You can move graphics data between PCs and Macs using TIFF (Tagged Image File Format) or EPS (Encapsulated PostScript). The PC and Mac use slightly different versions of TIFF, but at least two applications can resolve these differences: *Adobe PhotoShop* and *MacLinkPlus/PC*. EPS is a file format offered by many graphics programs that run on the Macintosh; if the file needs to be edited, be sure to use *Adobe Illustrator 88 EPS*.

■ Spreadsheets are the easiest file formats to move between the PC and the Mac. Simply store in either *Lotus 1-2-3* or *Microsoft Excel* formats.

■ If a file is not stored in a common format, you can convert it to a different file format with any of the numerous file-translation packages currently on the market. ■

and Mac filenames and types.

In addition, we cover some of the specifics of sharing files on the two platforms. The chart "Converting Files Between PCs and Macs" lays out the procedures for converting files from popular PC applications to files you can use on the Macintosh.

PRACTICAL TIPS

While reading through these articles, it is a good idea to keep some practical tips in mind. Always consider your future needs when you buy. Take cabling, for example. When expanding their network, the users at one site made the mistake of ordering extra LocalTalk cable from their reseller simply because it was what they had bought in the past. LocalTalk is the hardware scheme bundled with every Macintosh; it can also be used to connect to PCs. The problem is that its slow speed of 230.4 kilobits per second (Kbps) makes LocalTalk less than ideal as a solution for large networks and for building PC-to-Mac workgroups. By calling up the reseller and telling him that they wanted to purchase Token-Ring equipment, the users were able to stop the purchase of the less robust (but less expensive) cabling.

OUR CONTRIBUTORS

David Greenfield is an associate editor of *PC Magazine*.

Jeffrey L. Carrell is a senior communications systems engineer for a large transportation company. He is a former Novell technical instructor and has designed and implemented LANs that include both MS-DOS-based computers and Macintoshes.

Les Freed is the founder and former CEO of Microstuf, now Digital Communications Associates' Crosstalk division. He coauthored the *PC Magazine Guide to Using NetWare* (with Frank J. Derfler, Jr.) and is currently working on his second book, the *PC Magazine Guide to Modem Communications*.

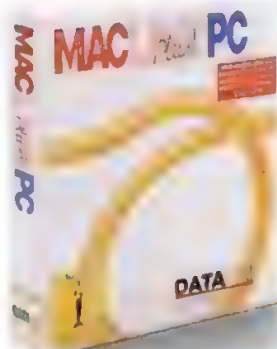
John Rizzo is the technical editor of *PC Magazine's* sister publication, *MacUser*, and author of the upcoming *MacUser Guide to Connectivity* (Ziff-Davis Press).

With MacLinkPlus/PC, Transforming Files Between PCs And Macs Is Amazingly Simple.



Transforming files between PC and Macintosh formats can be a real beast. But now there's an amazingly simple way to make Mac and PC files totally at home in each other's alien environment.

Introducing MacLinkPlus/PC. The first fully functional, truly simple way to exchange files and DOS disks between Macs and PCs with all their content and formatting preserved. Whether you're running applications under MS-DOS or Windows.



MacLinkPlus/PC is the complete solution for transferring and translating Macintosh files to and from your PC. And since 1984, it's been the very best.

Our vast library of file translators is packed with over 500 translation combinations for all popular word processing, graphics, database and spreadsheet applications. We've included a serial cable and easy communications software for connecting your PC to a Mac and transferring files, as well as a complete interface for both Windows and MS-DOS.

In businesses where more and more Macs and PCs are sharing desktops, MacLinkPlus/PC is a product you can't afford to be without.

Get MacLinkPlus/PC today. And see all your Macintosh files transformed before your eyes. For more information, call DataViz at (800) 733-0030.

DATAVIZTM
THE DATABRIDGE SPECIALISTS

NAVIGATING THE PC-TO-MAC MINEFIELD:
A GUIDE TO PC-TO-MAC DATA-TRANSFER OPTIONS



Similarly, some solutions for PC interoperability that ship with every Mac are cumbersome when Macs need to read PC files frequently. *Apple File Exchange (AFE)*, for example, is a foreground application that enables a Mac to read a file from a DOS floppy disk. Third-party programs that read the DOS files automatically in the background provide better solutions; these include *DOS Mounter*, \$89.95 from Dayna Communications (801-531-0600), and *AccessPC*, \$99 from Insignia Solutions (415-694-7600). A PC-based program that reads Mac disks, called *Mac-in-DOS*, is available from Pacific Microelectronics (415-948-6200) for a list price of \$199.

Another tip: Always plan for the worst. The major cost of a network is not the upfront price of the equipment, but the long-term costs that result from the time spent managing and repairing it. If you invest in the infrastructure from the outset, you can avoid some long-term costs.

Although LocalTalk essentially comes

built into the Mac, its low speed inhibits deploying large-scale client/server applications or printing large graphics files from applications such as *AutoCAD* or *Quark Express*. By paying the higher upfront cost of installing a higher-speed Ethernet network, you will save on the cost of managing and upgrading the LAN.

Be clear on your expectations. If you want to connect to a host, do you plan to connect computers through the existing gateway? Some currently available gateways that conform to IBM's Systems Network Architecture (SNA), such as those from Rabbit Software (215-647-

0440), do not support PCs and Macs (Rabbit promises to add Mac support soon). You might need to purchase a new gateway. The NetWay 2000 is one of the few gateways to support both PCs and Macs; it sells for \$6,995 to \$13,995 in different configurations, from Avatar Corp. (508-435-3000). Digital Communications Associates (404-442-4000) also supports PCs and Macs with its IR-

MALAN/EP SNA Gateway, for \$1,500 to \$7,500, depending on the number of sessions.

Be sure that you can manage both PC and Mac users on your network with a single utility. Novell, Microsoft, and Banyan allow you to use one utility to manage PCs and Macs, but Novell is the only vendor to provide user management utilities you can run from either platform. Microsoft and Banyan provide management utilities that must be run on the PC.

Cut the costs of printer sharing by attaching both PC printers and Apple LaserWriter printers directly to the file server. This allows the file server and its print-service function to manage the print jobs, rather than a separate remote print server. But with graphics-intensive print jobs, there may be some degradation in server performance.

By planning for the maximum amount of network traffic when you first install your network, you can save on an expensive revision later. Adding features and functions will be simpler if you have configured your LAN with a powerful base platform. Discussing and anticipating users' needs and expectations will allow for future expansion and integration with minimal expense.

**A network's
major cost is not
for equipment, but the
time for repair and
maintenance.**

HEY ZEOS FRIENDS: DO YOU HAVE SPRING FEVER?
ZEOS has the cure: a great new 486-50! It's so
fast and affordable that you can spend more time
enjoying yourself outside. Take a look on pages
48A-L then call ZEOS today: 800-423-5891.

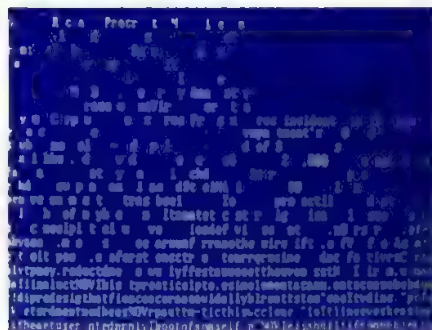
WILL YOU REMEMBER EATS YOUR MEMORY?



Just remember NOVI™ needs no updates. NOVI prevents or detects and perfectly repairs both known and unknown computer viruses from the moment you install it. NOVI works equally well on single PCs or LANs and is fully Windows™ compatible. Although NOVI can scan for viruses faster than anything else, virus scanning is one thing you can forget about forever. Just let NOVI's patent-pending "Integrity Management" take care of your PCs. There will be no hassles, no maintenance and no user intervention. You can forget about costly and time-consuming updates also, because you won't need them.

Viruses are creative little monsters that can eat up your profits.

Viruses spread very innocently from normal computer usage. Bulletin boards, hackers and malicious employees are not the problem. Almost 90% of infections come from diskettes, half from data-only diskettes and 3% from shrink-wrapped software. No one is immune. There were nearly 1,000 known viruses in 1991. Between three and five new viruses are created each day. Here are just three examples:

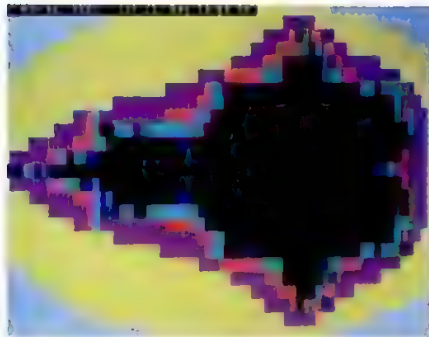


CASCADE VIRUS. By the time anyone sees the falling letters, your entire site is likely to be infected.



JOSHI VIRUS. This extremely common stealth virus damages hard drives and about half the floppies it travels on.

THIS AD AFTER A VIRUS

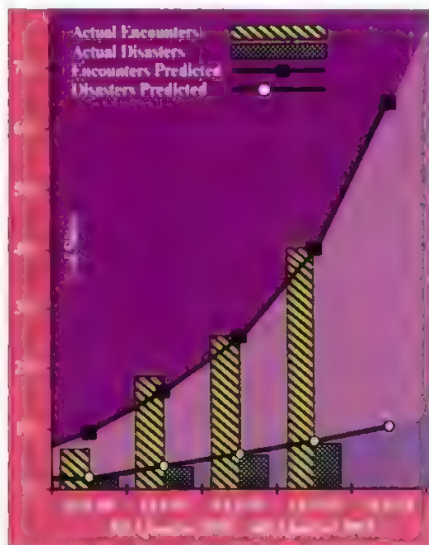


TEQUILA VIRUS. Using advanced anti-scanner and stealth techniques, the virus infects LANs and corrupts hard drives.

Do you think a virus could never happen to you?

Over 60% of American companies and governmental agencies are hit by viruses each quarter. The likelihood of a major virus disaster is doubling every four months.*

*All data from Dataquest/National Computer Security Association virus study (11/91).



Actual and projected percent of organizations experiencing virus disasters each quarter in North America (Dataquest).

How much are your data and downtime worth?

Viruses are no longer someone else's problem, as many businesses have discovered. When a virus hits, it can not only destroy your data and programs, it can also knock out your entire network. A virus puts you off-line until the problem is solved, while it ties up your best people for hours or days. With NOVI, you're always protected and productive.

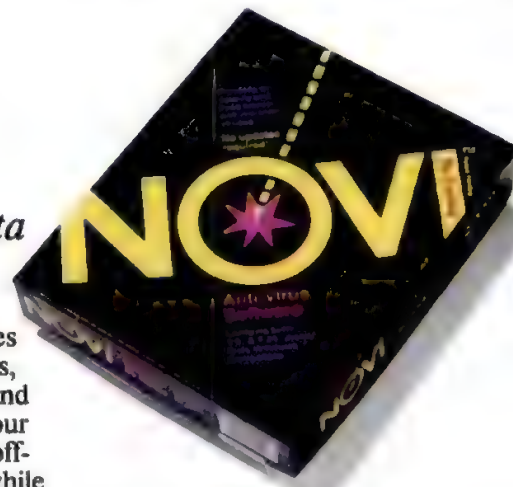
Designed to work in corporate computing environments.

NOVI has no database to maintain, no approval lists, no user updates or maintenance. It produces virtually no false alarms, even when its known-virus features are turned off. NOVI prevents file and system areas from getting infected in the first place. But if an infection occurs, NOVI perfectly repairs it, and returns you to normal operations. NOVI can do all of this automatically and invisibly, without showing a single user message. Or it can be set up to show up to a dozen customizable messages for you and your PC security personnel.

NOVI is the first Object Oriented anti-virus system. You can choose objects and tailor their behavior exactly to the needs of your environment. It occupies from 60 to 600 KB of disk space (with two on-line manuals and a comprehensive virus information base) and as little as 1.6 KB of RAM.

Easy to install, easy to use.

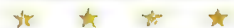
Installing NOVI can be as easy as booting from a NOVI "Clone" diskette or logging onto the LAN – no questions asked. A comprehensive LAN installation can be done under a minute. Logs of virus encounters can be stored locally or sent as a message to a LAN administrator.



Pac pricing protects organizations at less cost.

Multiple installation users get significant savings per unit with our unique 10, 25, 50, 100, or 500 pac licenses. This eliminates hundreds of boxes and manuals and provides you with enough licensed software to handle your entire organization or LAN.

Software Digest



Ranked by SOFTWARE DIGEST as the #1 anti-virus program. (Vol. 8.11-1991)
"NOVI completely out-classes the other programs with pure speed."

NOVI comes from Certus International, with a five year history of specializing in anti-virus, integrity management and systems management software.

Call 1-800-SAY-NOVI.



certus

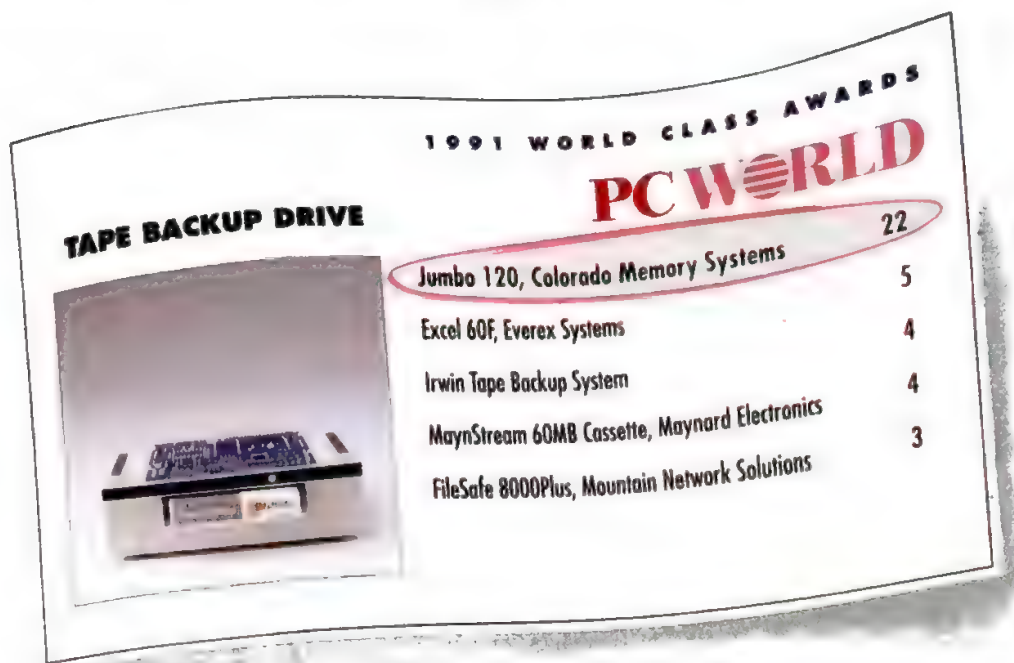
Certus International Corporation

6896 West Snowville Road
Brecksville, Ohio 44141 • 216-546-1500

©SOFTWARE DIGEST is a registered trademark of National Software Testing Laboratories, Inc., a Datapro co.

CIRCLE 138 ON READER SERVICE CARD

World class performance.



Rock bottom price. Now, just \$250.

Winning the World Class Award in tape backup was great news! So is our new low price. Because both simplify your tape-drive decision. Jumbo is simply the obvious choice. Particularly since the competition isn't even close...in performance or price. Jumbo topped PC World's list of backup tape drives by a 4-to-1 margin. In poll after poll, Jumbo consistently comes out on top. So why not go world class?

You'll save money in the process.

Choose either Jumbo 120 (120 MB with data compression) or Jumbo 250 (250 MB with data compression). Both give you QIC compatibility, Novell® certification, and UNIX®/Xenix® support. Call 1-800-451-0897, ext. 151 today for a free brochure.



Jumbo 120
\$250

Jumbo 250
\$350

**COLORADO™
MEMORY SYSTEMS INC.**

800 S. Taft Ave., Loveland, CO 80537

Chart based on data compiled by PC World Magazine, October 1991. © 1991 PC World Communications, Inc.
Novell, UNIX and Xenix are registered trademarks of their respective companies. © 1991 Colorado Memory Systems, Inc. All rights reserved.

CIRCLE 026 ON READER SERVICE CARD

PC-TO-MAC FILE EXCHANGE

A Range of Approaches

By John Rizzo

A host of new products can bridge the PC and Mac isles inexpensively. Here's a look at those products and what they can do for you.

Low-cost PC-to-Mac connectivity divides into three areas: sharing printers and other devices, sharing files, and transferring files. Here is a rundown, based on experience and testing, of the products and techniques that work best.

For sharing printers, you can use a simple printer-sharing device or install a small network. Several printer-sharing devices are available, including MacPrint, \$149 from Insight Development Corp. (510-652-4115); Grappler IIsp, \$159 from Orange Micro (714-779-2772); and Jet-Link Express, \$159 from GDT Softworks (604-291-9121).

Many printers for the Macintosh environment connect directly to the network. The \$4,599 Apple LaserWriter IIg can connect directly to Ethernet and Local-Talk networks simultaneously. Another



ILLUSTRATION: DON BECKER

option is the \$499 Etherprint, from Dayna Communications (801-531-0600), an Ethernet-to-LocalTalk converter for printers. Hewlett-Packard (619-487-4100) also designs its \$5,495 HP LaserJet IIIsi specifically for sharing over a network, and it sells an AppleTalk interface kit for \$275.

A wider range of solutions is available for sharing files. Some products take the interesting approach of allowing you to run DOS programs on the Macintosh. These include *SoftPC*, \$199 from Insignia Solutions (415-694-7600) and *RunPC*, \$219 from Argosy Software (212-274-1199). Also in this category is an add-in board called the Orange386 (\$1,799 to \$2,199, depending on the configuration) from Orange Micro (714-779-2772). *RunPC*'s solution probably provides the best mix of price and performance, but the Orange386 is faster. Andor One, \$995 from Hydra Systems (408-253-5800), lets you run Mac applications on the PC, but it uses old Macintosh ROMs; this limits you to a monochrome graphics display and a limit of 4MB of RAM.

Most times, however, you will simply want to exchange files with either nonnetworked Macs or Macs attached to a different network than your own. In that case, the process of exchanging a file boils down to two basic steps: translating the file into a format that the other computer can read (sometimes called *filtering*) and moving the files in electronic form so they arrive intact.

File-translation options come in a host of different flavors, some of which you can mix and match, including:

- converting files to ASCII;
- running application software available on both the PC and Mac platforms;
- using spreadsheet and graphics file formats supported on both platforms;
- running third-party file-translation programs.

Once you have the files in a format the other machine can use, you can move them with floppy disks, serial cable connections, modems, or low-cost LANs and gateways.

FILE FORMAT DIFFERENCES

One problem with sharing files involves the DOS and Macintosh naming conventions (see the sidebar "Naming Names: The Mac File Format"). When copying Mac files to PCs, some translating and transfer programs truncate the long Mac filenames and strip out characters illegal in DOS names, such as \, <, >, |, ?, and *.

When copying DOS files to a Mac disk (and sometimes the other way), some utilities for sharing floppy disks and network operating systems perform extension mapping. They look at the DOS file's three-character extension and assign an invisible four-letter Macintosh creator and type code to the file. The creator code designates the application, such as *Microsoft Word*, that will open when a user double-clicks on the file; the type code designates the file format, such as Pict, .TXT, or .WKS.

Of course, merely telling an applica-

tion to open a file by assigning it a familiar filename extension does not mean the application can read the file. You need to translate the file into a format that software applications can understand.

The fastest translation method is exporting a file in ASCII text, the lowest common denominator for interplatform communications. But you will lose all of the formatting information, including bold, italic, columns, and special characters. With spreadsheets, converting to ASCII will get you only the cell data, not the formulas. And ASCII will not help with importing graphics files. In addition, the so-called upper ASCII characters, such

NAMING NAMES: The Mac File Format

by Les Freed

No matter how cozy Apple and IBM get, PCs and Macs will never be the same, and neither will most of their files. Macintosh files are fundamentally different from their PC counterparts. Understanding those differences will help you bridge the gap between the two platforms.

All PC files are *flat*: They are a sequence of bytes stored on a disk in sequential order. Other than the three-character filename extension, DOS files do not include any information to indicate what type of data they contain.

Macintosh files also contain a sequence of bytes stored on a disk, but Mac files may contain two portions, or *forks*. Every Mac file has a *data fork*, and some files also contain a *resource fork*. A data fork contains only data, while a resource fork may contain program code, icons, sounds, and other Macintosh system resources. Data files, such as those produced by word processing programs, contain only a data fork. Application programs and system software files contain a data and a resource fork.

The Mac operating system maintains a directory of all files on every disk, much as DOS does. But the Macintosh directory information is more comprehensive than what is shown in the DOS directory. Every Mac file has a file type and a file creator name associated with it. The Mac operating system uses this infor-

mation to determine which application to start when the user double-clicks on the file's icon. The creator and type information also tells the Mac operating system which icon to associate with the file.

In addition, Mac filenames can be up to 31 characters long and can contain mixed-case letters, punctuation marks (except for colons), and spaces. DOS filenames are limited to the familiar eight-plus-three-character style.

DOS file types are completely arbitrary; software developers are free to choose whatever file extension they like for their application's files. Over the years, a few standards have evolved. If you see a file named MAILING.DBF, you can be pretty sure it is a *dBASE* data file. If you see a file named REPORT.DOC, you can be fairly certain it is a word processing document; you will just have to figure out which word processing program created the file.

Macintosh file and creator types are coordinated by Apple. When a developer wants to create a new file type, that person contacts Apple, and Apple reserves a type and creator for that application. The procedure guarantees that all applications have unique creator codes and the Mac operating system knows which icon to show for each application's files. This is one sign of how the Mac's operating system, unlike DOS, provides built-in hooks to a graphical interface. ■

In Celebration
of Our Unbelievably
Low Prices,
We Bring You Yet Another
Unbelievable Act
Of Lowness.



*We are to PC prices what Marlene Raymond is to limbo dancers;
the lowest on record (0 1/8 inches).*

COMPUDYNE

THE LOWEST OF THE LOW PRICES. GUARANTEED.

And Now The 'Who', 'What' and 'How Much'

"Who?" Compudyne™ is the PC manufacturing and direct marketing arm of CompUSA™—The Computer SuperStore (NASDAQ symbol; CUSA)—inventors of big volume, deep discounting PC retailing, and the largest chain of computer super stores in the country. Compudyne manufactures top quality, fully

supported computers as available from only the largest PC manufacturers at prices typically found only at garage shop clone houses. Results? We're already one of the largest direct PC companies in the country and probably the fastest growing PC company in the history of the industry!



Compudyne is probably the fastest growing PC company in the history of the industry.



We are to notebooks what Grizelda of Skyland was to Pomeranians; the lightest, at 1 lb., 12 oz.

The First of a New Generation:

- Only 5.5lbs. with battery
- Slim, trim 11" x 8.5" x 1.6" (yes, only 1.6" thick!)
- Full 10", 64 grayscale brilliant VGA screen
- Internal 3 1/2" 1.44 MB floppy drive
- Built-in trackball saves carrying a mouse
- Microsoft® Windows 3.1 installed ready to run!
- External SVGA monitor and keyboard support
- Toshiba-compatible external expansion bus
- User-installable FAX modem and other options
- Nickel hydride ready!
- Full keyboard—dedicated 'page up/down', 'home' and 'end' keys
- Built-in serial (2) and parallel (1) ports
- FCC Class B certification



Notebook	CPU	RAM	HD	Battery Life	Price
		Mb	Mb	h	
386SXL/25	386SXL-25 MHz Optional 80387SX	2 standard 4 & 6 options	60	3+	\$1,699 \$63/mo*
386SL/25	Intel 80386SL-25 MHz 64 K CPU cache Advanced SL power mgt Optional 80387SX co-processor	2 standard 4 & 6 options	80	3+	\$2,199 \$81/mo*
486SX/25	Intel 80486SX-25 MHz Built-in 8K CPU cache	4 standard 8 & 20 options	80	2.5+	\$2,999 \$111/mo*
486DX/33	Intel 80486DX-33 MHz Built-in 8K CPU cache	as above	120	2.5+	\$3,499 \$130/mo*



24

HOUR

FAX: 1-214-702-0300

COMPUDYNE

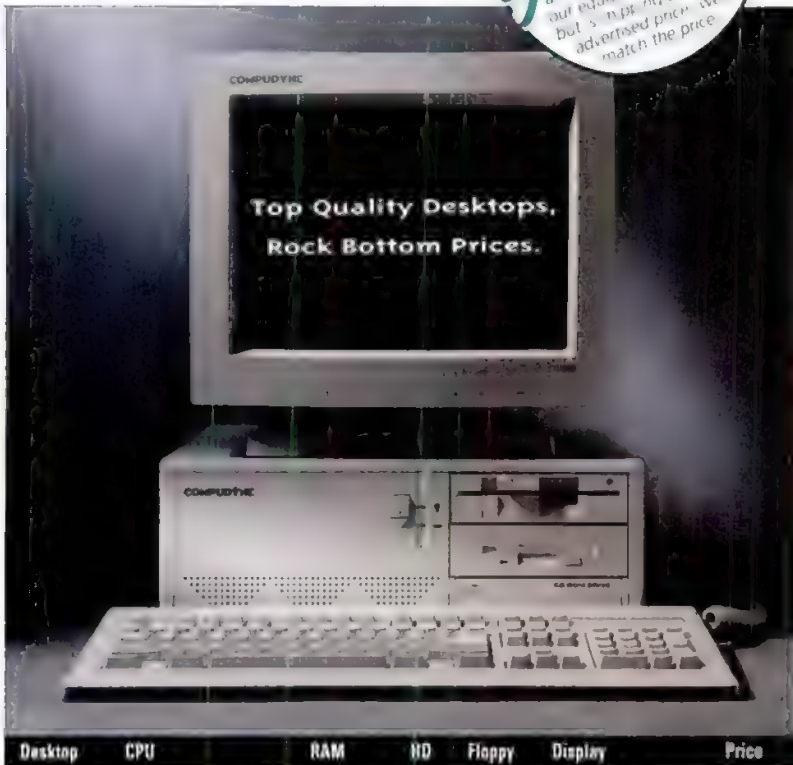
THE LOWEST OF THE LOW PRICES. GUARANTEED.

Behind The Nation's Lowest PC Prices.

"What?" We sell everything. Besides the selection of notebooks, desktops and system options you see here, we sell thousands of top quality branded PC products, which we can build into the system of your choice.



"How Much?" We guarantee that our prices are the lowest of any currently advertised. If by chance another manufacturer got a late-breaking reduction to press a few minutes before us, rest assured, we'll beat it.



Desktop	CPU	RAM (MBs)	HD (MBs)	Floppy	Display	Price
386SX/25	Intel 80386SX-25 MHz	1 standard 32 max	40	1.2 or 1.44	16 bit SVGA card 14" 640x480 VGA color monitor	\$899 \$33/mo*
386SX/25	Intel 80386SX-25 MHz	1 standard 32 max	80	as above	as above	\$999 \$37/mo*
386DX/25	Intel 80386DX-25 MHz	2 standard 32 max	80	1.2 & 1.44	16 bit SVGA card 14" 1024x768 SVGA color monitor	\$1,299 \$48/mo*
386DX/33 CACHE	Intel 80386DX-33 MHz 32K CPU cache	4 standard 32 max	120	as above	16 bit SVGA card w/ 1MB video RAM & 32,000 color support 14" 1024x768 SVGA non-interlaced color monitor	\$1,699 \$63/mo*
486DX/33 CACHE	Intel 80486DX-33 MHz 128K CPU cache	4 standard 64 max	120	as above	as above	\$1,999 \$74/mo*
486DX2/50 CACHE	Intel 80486DX2-50 MHz 128K CPU cache New Double Clock CPU	4 standard 64 max	210	as above	as above	\$2,499 \$89/mo*

All Systems Feature:

- Rugged, aesthetic Macintosh style case on steel frame
- Microsoft® Windows 3.1 installed ready to run¹
- Microsoft compatible serial mouse¹
- Artisoft's LANtastic® LAN
- 101 AT-style keyboards
- Built in serial (2), parallel (1) and game (1) ports
- 8 I/O board slots
- 200 watt power supply
- FCC Class B certification
- U/L listed



Options, Options, Options...

- **Displays:** Mono or color VGA; 1024 and 1280 interlaced or non-interlaced; 14" to 20"
- **Hard Drives:** 40; 80; 105; 120; 211; 483; 680 MBs or 1.2 GBs
- **Internal CD-ROM** (Inc. Groliers Encyclopedia, Toolworks, Reference Library and PC-SIG)
- **Internal FAX/Modem:** 9600 bps send/receive fax; 2400 bps modem; inc. WinFax and Quicklink Software.
- **And many, many more!**



PCM0521

SERVICE & SUPPORT

- Toll-free technical support hotline
- On-site service for desktop systems* and overnight replacement for portables
- Next-day shipping for most systems



WARRANTIES

- 30-days, no-questions-asked return policy**
- 1 year limited warranty

ORDERING

- Order Toll-free: 1-800-932-COMP (2667), 8am-7pm (CST) Mon.-Fri. and 9am-4pm (CST) Sat.
- International callers dial: 1-214-702-0055
- 24 hour fax: 1-214-702-0300
- Custom configurations of top brand hard and software. Just ask!
- Corporate credit and volume discount terms available

You can also buy these neat products at the same outrageous prices exclusively at

COMPUSA
THE COMPUTER STORE



COMPUDYNE

THE LOWEST OF THE LOW PRICES. GUARANTEED.

*Within 100 miles of any of hundreds of Texas Instruments Service Centers

**Must be returned as new in original packaging

Intel™ 386 & 486 & the Intel Inside logo are trademarks of Intel Corp

™/® Trademarks belong to their registered owners

Prices and specifications subject to change without notice.

Compudyne Direct, 15151 A Surveyor, Addison TX 75244

CIRCLE 132 ON READER SERVICE CARD

as bullets and apostrophes, sometimes have difficulty making the trip from Mac to PC. This is because the Macintosh operating system defines all 256 ASCII characters, while DOS defines 128 characters and leaves the rest to be defined by different applications.

Some translation problems occur with the open and closed quotation marks supported by the Macintosh operating system. Since these curly quote marks are part of the upper ASCII characters, DOS has to substitute other characters for them, such as an R for an open quotation mark and an S for a closed quotation.

There are a few de facto text file formats that applications can use to translate between different vendors' applications. Saving a file in Microsoft's .RTF (Rich Text Format) can sometimes ease translation for a program such as *PageMaker*, which can translate some of the upper ASCII characters from .RTF. Unfortunately, even Microsoft implements .RTF inconsistently in its software, so results can vary. For example, the DOS version of *Microsoft Word* suggests saving files for Macintosh use in .RTF (found under the Save As option), but *Microsoft Word for Macintosh* offers a *Word for DOS* format in the Save As menu.

Graphics files tend to be the most troublesome, largely because these were the last types of files that third-party translators were developed for. In addition, some graphics file formats come in different versions, particularly on the PC side.

Both Mac and PC programs can use a few intermediary graphics file formats, however. Most Mac graphics programs worth their salt output EPS (Encapsulated PostScript), which you can input into many PC programs, such as *PageMaker*. But not all EPS formats are alike, and if you need an editable file, you may run into trouble. *Adobe Illustrator 88* EPS format is a good format to use for editable EPS, since several Mac programs support it directly.

Most Mac graphics programs can also save in bitmapped TIFF format. The Macintosh and PC versions of TIFF differ from each other in the file header, but

there are fewer problems than with EPS. *MacLinkPlus/PC*, from DataViz (203-268-0030), can translate between the Mac and PC versions, and the popular Mac program *Adobe PhotoShop* can save directly in PC TIFF format. *PhotoShop* can also import and export in .GIF and .TGA, two PC bitmapped formats not common in Mac programs.

You can keep most of a file's formatting by using the built-in import/export capabilities of some popular applications that are available in both Mac and DOS versions. *WordPerfect* and *Microsoft Word* come in PC, Mac, and Windows versions. They retain formatting in importing and exporting, but you may run into problems with feature sets the vendor has not implemented in all versions.

Spreadsheets are the easiest types of files to translate, mainly because *Lotus 1-2-3* and *Microsoft Excel* (the predominant Mac spreadsheet) are available on both platforms. Excel and many other Mac programs support *Lotus 1-2-3's* .WKS, .WK1, and .WK3 formats. Although

many spreadsheet formulas are common to both *Excel* and *1-2-3*, a few may be lost in translation.

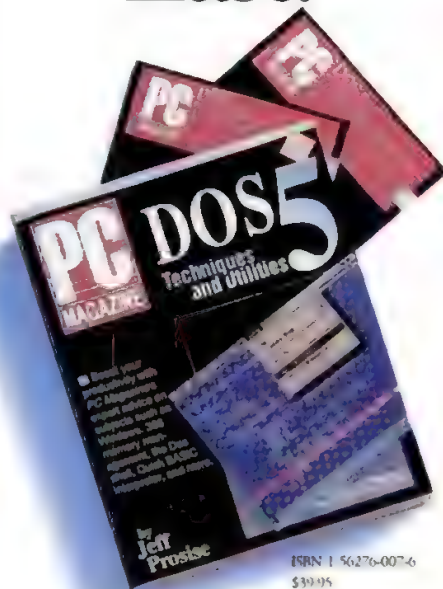
THIRD-PARTY TRANSLATORS

Many times, you will need to exchange a file whose format is not directly supported by the applications you want to run on the other platform. You then need a translator to change the format into one the other machine can use. Although Apple includes its *Apple File Exchange (AFE)* utility with the Macintosh, allowing you to copy files from DOS 3.5-inch disks on to the Mac, *AFE* provides few translators.

Luckily, there are alternatives. For translating between a variety of origination and destination applications, you will do best with a third-party data-translation utility, such as *MacLinkPlus/PC*, \$199 from DataViz; *Laplink Mac*, Version 3, \$149.95 from Traveling Software (206-483-8088); *Word for Word/Professional* and *Word for Word/Mac*, \$149.95 each from The Software ToolWorks and Mas-

*Graphics files tend
to be the most
troublesome to
translate between
the PC and Mac
platforms.*

It's Not The First Word On DOS 5. It's The Last.



Jeff Proise, nationally recognized DOS expert and author of *PC Magazine's* "Tutor" column, goes far beyond the manual in this book/disk package to help you achieve peak performance. He also picks up where DOS 5 leaves off with 50 all-new DOS 5 utilities. You'll find productivity-boosting programs that will dial your phone, search an entire disk for files, expand printer capabilities, compile batch files, and much more. No other DOS 5 guide comes close.

1-800-688-0448



© 1991 Ziff-Davis Press
5903 Christie Avenue
Emeryville, CA 94608

Harvard Graphics quote, is easy to

"I'll focus on its most impressive aspect: it's easy to use. This is one of the nicest things you can say about presentation software..."

— BYTE Magazine,
D. Barker, 12/91

"Harvard Graphics' strength is that it's designed to let you create entire presentations with the least possible fuss."

— PC Magazine 2/25/92

"If you're serious about presentation graphics, this is a serious product for you to consider. It's easier than any you'll find on the market. It's every bit as powerful. And it'll carry you farther into the future."

— PC Magazine 2/25/92

"SPC has long experience with presentation graphics—and it shows."

— PC Computing 1/92

To see what everyone's talking about, call 1-800-336-8360, Operator 845, for your

ics® for Windows, o use, unquote.

"It's ease of use, in concert with a full battery of features, places Harvard Graphics in the front of the presentation pack."

— PC Computing 2/92

"Users may never again settle for products that do not make child's play out of creating captivating, advanced presentations."

— InfoWorld 8/5/91

"...Harvard Windows promises to be a surefire hit with presentation novices and veterans alike."

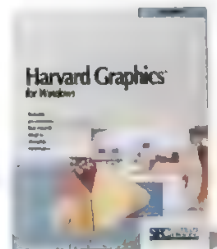
— PC World 12/91

"Harvard Windows makes it easier than ever for you to produce 35mm slides, transparencies, printouts, and screenshows."

— PC World 12/91

free Harvard Graphics for Windows demo disk.

SPC SOFTWARE
PUBLISHING®



A MACINTOSH GLOSSARY FOR PC PARTISANS

by Les Freed

Long-standing differences between PC and Macintosh users may have their roots in the lack of a common vocabulary. We in the PC community have our jargon; the Mac universe has its own set of buzzwords. If you are going to connect Macs and PCs on the same LAN, it may help to understand the basic Mac networking lingo.

AppleShare File Server Apple's own file server program. *AppleShare* runs on a Mac (usually a IIcx or better) and lets other Macs use files and printers attached to the server.

AppleShare Workstation The software that a Mac uses to connect to shared network resources, such as printers and file servers. *AppleShare Workstation* comes as part of the Macintosh System Software. Virtually all third-party network products use *AppleShare Workstation* as their Macintosh client.

AppleTalk Apple's suite of networking protocols. At one time, AppleTalk also referred to the cabling system now known as LocalTalk. AppleTalk runs over LocalTalk as well as Ethernet or Token-Ring. Among the services included in AppleTalk are AppleTalk Filing Protocol (AFP) and AppleTalk Print Service (ATPS).

Chooser The utility program used to select among available printers and network file servers. Apple uses "-er" names for most of its utility programs. With Chooser, for example, clicking on the LaserWriter icon brings up a list of all the Apple LaserWriters on the network. You choose one by clicking on its name.

creator code A four-character code, present in every Mac file, that identifies the program that created the file. The Mac operating system uses the creator code to determine which icon to display for any given file. Apple issues creator codes on request from developers, ensuring that every application has a unique creator code.

data fork The part of a Mac file that contains only data. Mac files may contain two parts, or forks: a data fork and a resource fork. Data files typically contain only a data fork, while program files usually contain both a data and a resource fork.

Encapsulated PostScript (EPS) A self-contained PostScript format. You can copy an EPS file directly to a PostScript printer, and it will print the image contained in the file.

EPS files are commonly used to exchange image data between application programs. Many Mac and PC graphics packages can read and write EPS files, although EPS formats are not always the same. *Adobe Illustrator's* 88 EPS format is supported by several Mac applications.

extension mapping The process of assigning Macintosh creator and type codes to a file that is created on a LAN shared by Macs. Extension mapping is automatic for some LAN

operating systems, but not for the operating system in Mac workstations.

folder A Macintosh subdirectory.

Installer A fiendishly clever and useful program that installs new software onto a Mac system. Installer can make changes to the system software, drivers, control panels, and other items, and it operates under the control of an installer script. The user merely has to put the program to be installed into a floppy disk drive and click on the Installer.

LaserWriter Apple's original laser printer and the world's first PostScript printer. A variety of LaserWriter models are on the market, the top of the line being the Apple LaserWriter IIg. To PC users, the LaserWriter works like other PostScript printers.

LocalTalk Apple's low-cost networking hardware for running the AppleTalk network environment. Built into every Macintosh computer, LocalTalk operates at 230.4 kilobits per second. Although slow in comparison with Ethernet and Token-Ring, LocalTalk is fast enough for occasional use.

NuBus The architecture on which the expansion slots in Macintosh IIx-family computers are based. NuBus was designed by Motorola as a universal expansion bus for machines in the Motorola 68000 family. Other Macs, such as the SE and LC, use Apple's proprietary expansion slots.

PhoneNET Talk A network system that connects PCs and Macintoshes to AppleTalk and gives them services such as printer sharing and file sharing at all levels. *PhoneNET Talk* can run on Ethernet, Token-Ring, or LocalTalk hardware. Apple originally developed the software (calling it *AppleShare PC*) and then sold it to Farallon Computing, which sells an enhanced version as *PhoneNET Talk*.

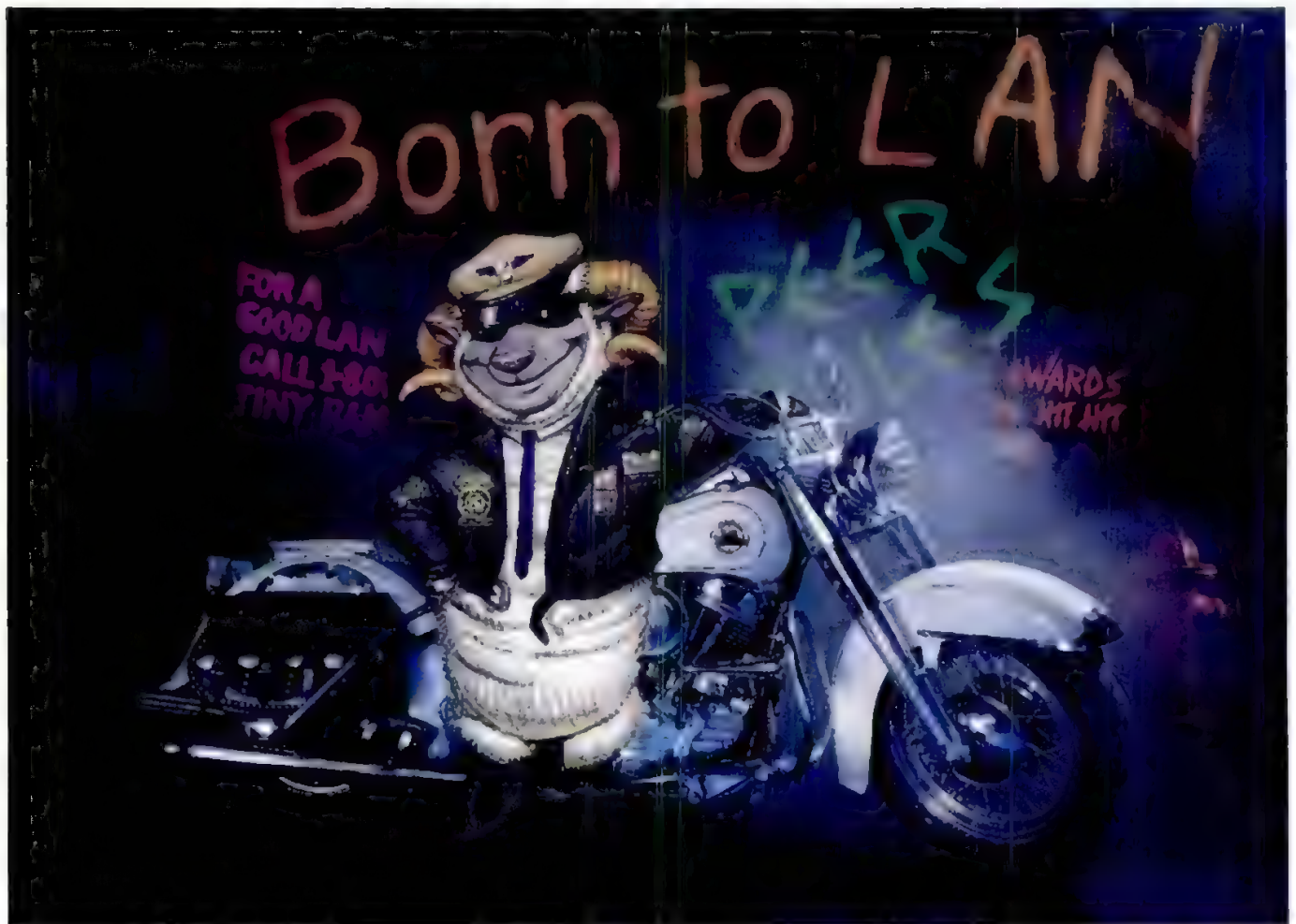
resource fork The part of a Macintosh file that contains system resources such as code, icons, and sounds.

SuperDrive Apple's 1.44MB drive. Macs equipped with a SuperDrive can read and write 720K and 1.44MB PC disks. But since PCs use a different 1.44MB format, they cannot read Mac disks directly.

Macintosh System Software, Version 6.x or 7.x The Macintosh operating system. While the PC operating system was called DOS, Apple never gave the Mac operating system a distinctive name, preferring to call it simply the System. System 7 is the latest incarnation, released in May 1991, but System 6 is still in wide use.

zone A group of associated devices logically located on linked networks. Zones are usually used to break big AppleTalk networks into manageable chunks. A user can elect to see only the devices in the local zone, regardless of their physical location. AppleTalk uses a Zone Information Protocol (ZIP) and Zone Information Table (ZIT) to keep track of data moving across the internetwork connection. ■

LEADER OF THE PACK



The LANTastic® Peer-to-Peer system means POWER

Start up your PC network with a roar! Artisoft, the first company to win major awards for both networking hardware *and* software, can put your company in the fast-lane of productivity. We're the innovation leader:

- ♦ The first to offer networking software that fully supports Microsoft® Windows™
- ♦ The first to add Voice features to the network
- ♦ The first to offer complete Starter Kits
- ♦ The first to introduce the Central Station™ connectivity platform concept

LAN TIMES
READERS
CHOICE
1991

PC
MAGAZINE
EDITORS'
CHOICE
June 25 1991
LANtastic Version 4.0

LAN MAGAZINE
1991 PRODUCT OF THE YEAR



**AUTHORIZED
DEALER**

Visit your Artisoft
Authorized Five
Star Dealer

Gearing up to install and operate our LANtastic Network Operating System is easy. It's very fast, uses the smallest RAM of any peer-to-peer NOS and it's economical to run, **at only \$99 per network!**

In addition, we have comprehensive guarantees and warranties to protect you from bumps and glitches, so you can zoom right by the less stable products on the networking market.

Artisoft and our LANtastic Network Operating System – we can link your PCs into one smooth network and accelerate your company's operations to help *you* become the leader of the pack.

 **ARTISOFT**
Revolutionizing Connectivity

691 East River Road, Tucson, AZ 85704 USA

Sales/Customer Service: 1-800-TINY RAM

Fax: 602-293-8065

CIRCLE 254 ON READER SERVICE CARD

tersoft (415-883-3000); or *Software Bridge*, \$149 from Systems Compatibility Corp. (312-329-0700). A \$159 version of *Software Bridge* that runs on the Mac is available from Argosy Software (212-274-1199).

Of these, *MacLinkPlus/PC* is the most comprehensive file-translation package, with more than 400 translation combinations of word processing, spreadsheet, graphics, and database formats. You can operate *MacLinkPlus/PC* from a Mac, but you can operate it only from a PC that is connected to a Mac serially or on a network. *Software Bridge* has fewer translation options but sometimes does a better job translating the details of a file's format. *Word for Word* also offers fewer translation options than *MacLinkPlus/PC* but still has over 90. *LapLink Mac* offers even fewer translators, mostly for word processors, and suffers from a shortage of translators for Mac word processors. Your best bet is *MacLinkPlus/PC*, because of its versatility.

MOVING FILES

Translating the file is just one half of the equation; you still have to get the file off of the Mac and onto your PC, or vice versa. Five different approaches are available: floppy disks, direct serial-cable transfers, modem transmissions, low-cost LANs, and network gateways.

Floppy disks are the simplest of all file-transfer methods. You can use one of two available options: add-on software or hardware that allows the PC to read Mac floppy disks or the built-in ability of most Macs to read and write in DOS and OS/2 formats.

Third-party vendors have taken different approaches to enabling a PC to read Mac floppy disks. MatchMaker, \$149 from Micro Solutions Computer Products (815-756-3411), provides software and an add-in card for connecting Macintosh-compatible external floppy disk drives. When you run MatchMaker's MAC program, the Macintosh floppy disk drive becomes the M: drive on your PC.

The Deluxe Option Board, \$159 from Central Point Software (503-690-8090), is an additional controller board for your PC floppy disk drive that lets it read Mac disks when you run the included Macintosh control software. But the board does not work with Micro Channel architecture (MCA) machines. And several disk drives do not work with the Central Point board, including models from Alps, Mitsubishi,

Mitsumi, and Panasonic; check with Central Point for compatibility.

Both MatchMaker and the Deluxe Option Board can use only 800K Mac floppy disks, not the newer 1.44MB Mac floppy disks. (Most Macs can read both, since neither is the dominant format at this time.) Both products were designed before high-density floppy disk drives for the Mac became available and have not been updated.

Two software-only products, Pacific Microelectronics' \$199 *Mac-in-DOS* (415-948-6200) and Peripheral Land's \$139 *Mac-to-DOS Transfer* (510-657-2211), are designed to read only 1.44MB floppy disks; access occurs from within the software application. Both products would need extra (unavailable) hardware to understand the 800K disk format. Of these two products, Peripheral Land's *Mac-to-DOS Transfer*, Version 3.0, is the better buy; it offers the ability to read, write, and format Macintosh SyQuest, Bernoulli, and optical cartridges. *Mac-to-DOS Transfer* also includes a basic text editor that lets you write directly to ASCII files on the Mac disk.

It may be more convenient for the Macintosh user to send a PC-formatted floppy disk. Since 1989, most Mac models have shipped with an internal 3.5-inch floppy disk drive, the SuperDrive, that can read from and write to OS/2 and MS-DOS floppy disks in 720K and 1.44MB formats. But the Mac's 1.44MB format is not the same as the 1.44MB format under DOS. You can also buy external floppy disk drives from Apple and other vendors that will read 5.25-inch DOS floppy disks on most Mac models. The DaynaFile, \$599 from Dayna Communications, is the most popular and oldest 5.25-inch floppy disk drive for the Macintosh. Using Dayna's *DOS Mounter*, a Mac is able to read DOS-formatted SyQuest, magneto-optical, and other removable cartridges.

SERIAL CONNECTIONS

A serial connection between a Mac and PC is inexpensive and fairly simple to install. You can use a cable connected directly between the two machines or over telephone lines using a modem. A direct connection is faster, but modems work over longer distances, even remotely. Many computer dealers sell serial cables or null-modem cables for connecting a PC's 9-pin or 25-pin COM1 or COM2 port to a Mac's Mini DIN-8 modem port. Some cables come with both types of PC connectors on one end.

You can send a file directly to a Macintosh or to an electronic mail account on an on-line service such as CompuServe. With e-mail accounts, the sender and recipient

do not need to be on-line at the same time; the service will store the message or file until the recipient asks for it.

The easiest way to send a file over a serial cable or modem is to use one of the file-transfer packages mentioned earlier. *LapLink Mac* and *MacLinkPlus/PC* both come with serial cables. These programs take care of the file-transfer protocols for you automatically. Argosy's

MacLinkPlus/PC
is the most
comprehensive
file-translation
package, with more
than 400 combinations
of word processing,
spreadsheet, and
graphics formats.

\$219 *RunPC* is a screen-sharing program that lets you control a PC from a Macintosh over an included serial cable. The program includes the host side of *pcAnywhere*, Version 3, a popular PC-to-PC file-transfer program, in addition to Argosy's own *Software Bridge/Mac*. A network version of *RunPC* sells for \$445.

A general-purpose telecommunications software package will also work, whether you are using modems or a serial cable. On the Mac, you can run the *Zterm* shareware program or commercial packages, such as *Microphone II*, \$295 from Software Ventures (510-644-3232), and *White Knight Telecommunications Software*, \$139 from the Freesoft Co. (412-846-2700). With these programs, you have to choose a file-transfer protocol such as Xmodem or Zmodem.

NetModem/E, \$2,299 from Shiva Corp. (617-252-6300), adds network dial-

**THANKS
TO SWAN
MICROSOFT[®]
WINDOWS[™]
IS MOVING
20 TIMES
FASTER
THAN
BEFORE.**

The next revolution in personal computer performance is here.

Introducing the new Swan 486/33DB, the only PC equipped with the Swan Direct Bus. Much more than a video accelerator, the Swan Direct Bus system uses true local bus architecture. And while it may sound complicated, the results are simply amazing.

With screen refresh rates up to 20 times faster than before, both Windows and DOS applications run with blinding speed. Like re-draws in DTP and CAD, page scrolls in word processing, even switching from one window to another. You've never seen anything like it.

Unlike conventional computer bus architecture that sends video data along the same relatively slow data

path as other peripheral instructions, the Swan Direct Bus connects the video controller directly to the CPU. Combined with an advanced S3 video accelerator, the Swan Direct Bus delivers the kind of startling video performance you've only dreamed of.

Extraordinary Speed At An Amazingly Low Price

Once you catch your breath, we have more good news—the Swan 486/33 with the Swan Direct Bus is priced competitively with all our other low cost, high performance 486 models.

Call us toll-free. We'll save you money today on the kind of advanced computer systems that others won't even be shipping for a long time to come.



SWAN 386SX/20

- Intel 80386SX-20 System
- 1MB RAM, 50MB 17ms IDE Drive
- 12" Mono Monitor
- 5.25" or 3.5" Floppy

\$1135

SWAN EXPRESS

- 2MB RAM, 50MB 17ms IDE Drive
- VGA (1024 x 768) Monitor
- 1MB VGA Palette Plus Card
- 5.25" and 3.5" Floppies
- Swan Mouse & pad
- Windows, DOS 5.0

\$1795

- Same features as above with 4MB RAM, 100MB 17ms IDE hard drive

\$2095

SWAN 386/25

- Intel 80386DX-25 System
- 1MB RAM, 50MB 17ms IDE Drive
- 12" Mono Monitor
- 5.25" or 3.5" Floppy

\$1285

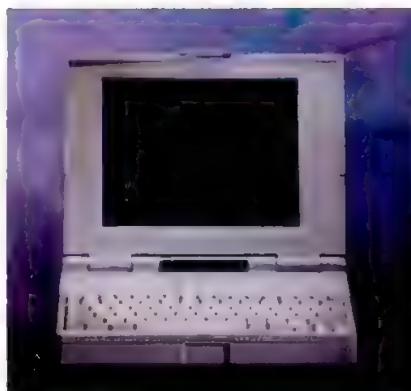
SWAN EXPRESS

- 2MB RAM, 50MB 17ms IDE Drive
- VGA (1024 x 768) Monitor
- 1MB VGA Palette Plus Card
- 5.25" and 3.5" Floppies
- Swan Mouse & pad
- Windows, DOS 5.0

\$1945

- Same features as above with 4MB RAM, 100MB 17ms IDE hard drive

\$2245



SWAN 386SX/25 Notebook

- 25MHz 386SX System
- 2MB RAM, Expandable to 8MB
- 40MB Removable IDE Hard Drive (60MB and 80MB Drives Available)
- Built-in 3.5" 1.44MB Floppy
- 10" LCD Screen, 640 x 480 Resolution, 64 Gray Shades
- 2 Removable NiCad Batteries
- Ports: 1 Serial, 1 Parallel, Mouse, DC In, Numeric Keypad, VGA
- Slots: Internal Fax/Modem, Internal Memory Card
- 80387 Coprocessor Socket

\$2395

SWAN 386/33M Upgradables

- Intel 386DX-33 System
- 4MB RAM, 64K Cache Memory
- 50MB 17ms IDE Drive
- 12" Mono Monitor
- 5.25" and 3.5" Floppies

\$1685

SWAN EXPRESS

- 4MB RAM, 50MB 17ms IDE Drive
- VGA (1024 x 768) Monitor
- 1MB VGA Palette Plus Card
- 5.25" & 3.5" Floppies
- Swan Mouse & pad
- Windows, DOS 5.0

\$2195

- Same features as above with 100MB 17ms IDE hard drive

\$2395

Also available as: 486SX/25, 486/33



SWAN 486SX/25

- Intel i486SX-25 System
- 4MB RAM, 8K Internal Cache
- 50MB 17ms IDE Drive
- 12" Mono Monitor
- 5.25" & 3.5" Floppies

\$1835

SWAN EXPRESS

- 4MB RAM, 120MB 17ms IDE Drive
- VGA (1024 x 768) Monitor
- 1MB VGA Palette Plus Card
- 5.25" & 3.5" Floppies
- Swan Mouse & pad
- Windows, DOS 5.0

\$2545

- Same features as above with 220MB 12.6ms IDE hard drive

\$3045

SWAN 486/33E

- Intel i486-33 System
- EISA Systemboard with 4MB RAM, Expandable to 64MB
- 8K Internal Cache, 128K External Cache standard, Expandable to 64MB
- 120MB 17ms IDE Drive
- Award BIOS
- Flash EPROM Support
- Shadow RAM for Video and BIOS
- Weitek 4167 Coprocessor Socket
- 8) 32-bit EISA Expansion Slots: 6 Bus Masters, 2 Bus Slaves
- 12" Mono Monitor
- 5.25" & 3.5" Floppies

\$2795

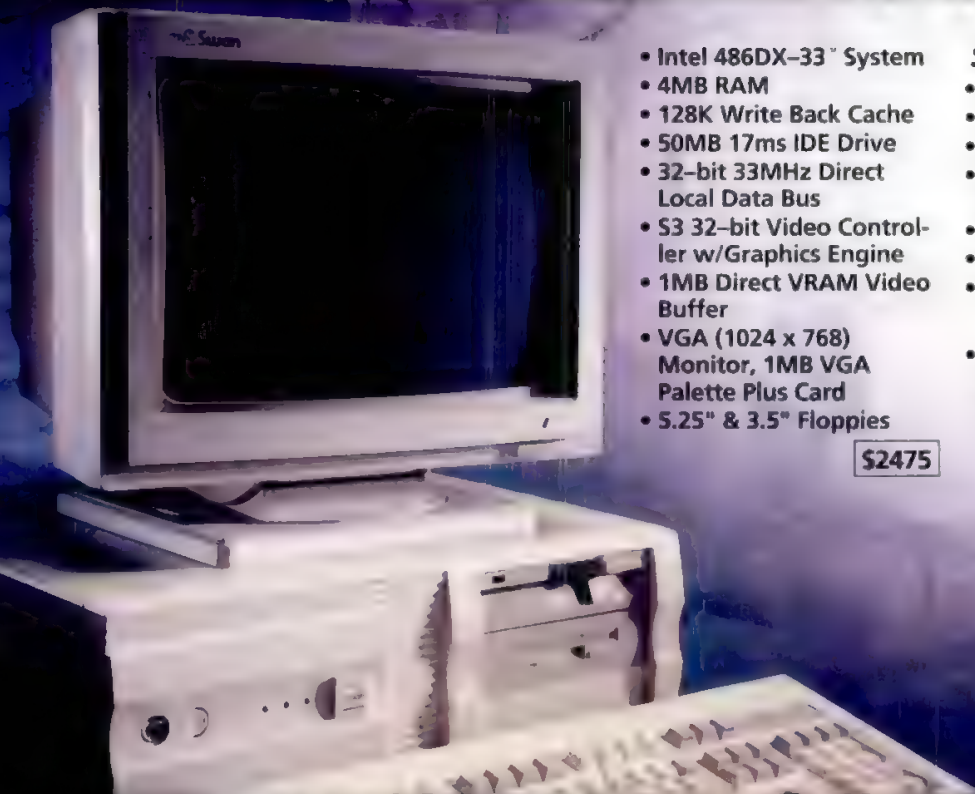


SWAN EXPRESS SYSTEMS INCLUDE \$439 OF FREE SOFTWARE

In addition to DOS 5.0 and Microsoft Windows, Swan Express systems include the

hot new Microsoft Works for Windows, Quicken for Windows, and Wealth Builder—installed on your hard drive, along with complete documentation and diskettes! A \$439 retail value—FREE!

INTRODUCING THE NEW SWAN 486/33DB.



- Intel 486DX-33™ System
- 4MB RAM
- 128K Write Back Cache
- 50MB 17ms IDE Drive
- 32-bit 33MHz Direct Local Data Bus
- S3 32-bit Video Controller w/Graphics Engine
- 1MB Direct VRAM Video Buffer
- VGA (1024 x 768) Monitor, 1MB VGA Palette Plus Card
- 5.25" & 3.5" Floppies

\$2475

SWAN EXPRESS

- 120MB IDE drive
- Swan Mouse & pad
- Microsoft Windows 3.1
- Microsoft Works for Windows
- Quicken for Windows, Wealth Builder
- DOS 5.0

\$2895

- Same features as above with 240MB 16ms IDE hard drive

\$3195

**THE FASTEST WINDOWS
PERFORMANCE
IN HISTORY.
AT A PRICE THAT
WILL MAKE A LITTLE
HISTORY ITSELF.**



1 - 8 0 0 - 4 6 8 - 9 0 4 4

THE FINEST COMPUTERS DESERVE THE FINEST SERVICE AND SUPPORT

We're Always At Your Service

If you've purchased systems from Swan before, none of what you're about to read will come as a surprise. But if you're among the uninitiated, you may find all of this quite remarkable. Not to mention quite refreshing.

For starters, Swan is consistently awarded top honors for brand loyalty, technical support and repair service. By people like the readers of PC Magazine and Government Computer News.

Small wonder, since service is what sets us apart. It's also helped to make us one of the fastest growing PC manufacturers in the country.

Thanks to our phenomenal growth, we're able to buy components in much larger volume, and pass the savings on to you. Best of all, they're all components from the best names in the business, like Intel, Sony, Hewlett Packard, Quantum, and Teac, to name just a few.

What's more, each Swan desktop computer is carefully hand-assembled by a single skilled technician.

Then, burned-in and tested for two full days before it leaves our plant.

Just compare and you'll see that feature for feature, dollar for dollar, no other PC manufacturer even comes close to the value you get with Swan.

The Only Free Two-Year, On-Site Warranty

Should you ever, even on the remote chance, need assistance for your Swan computer, you're covered by the finest service and support policy in the industry. Including free telephone support from our award winning tech support team. And a free two-year, on-site warranty on every 286, 386 and 486 desktop system we sell. No other major direct marketer gives you that kind of protection.

But don't take our word for it. See for yourself what the leading industry publications have to say. Then call Swan for the best value in computer systems available today.

YOU CAN'T BEAT A SWAN

“Swan earned top honors...these ratings mean Swan managed to make and keep its users happier than any other PC Manufacturer.”



PC Magazine
Service and
Reliability Survey

“Swan's engineers clearly demonstrated that the time of building PC's with whatever parts are cheapest is over.”



Bill Machrone,
Editor-in-Chief,
September 11, 1990

“Combining Swan's price with its overall scores makes it a very good value.”

WORLD

July 2, 1990

“Swan Technologies topped the list in federal user satisfaction.”



January 20, 1992



“Swan offers one of the best customer support policies in the mail order industry.”



May 1991

“Swan has earned a reputation for manufacturing highly reliable systems...and (Swan's) support policies only enhance that reputation.”



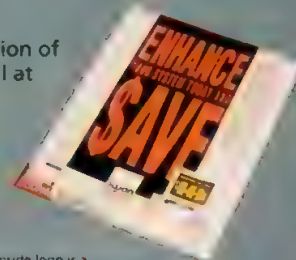
December 31, 1991

Call today for our free catalog!

Featuring a complete selection of systems and peripherals—all at great savings.



The Intel Inside logo is a trademark of Intel Corporation



• No surcharge on credit card orders • Your credit card is not charged until your order is shipped • Allow 2 weeks for all checks to clear • Items returned must be as new without modification or damage All warranty cards, manuals, and packaging material must be included Return shipping must be pre-paid and insured, bearing an RA# on the shipping label • Shipping and upgrade fees are non-refundable • Defective items replaced or repaired at our discretion • Prices & terms subject to change without notice • TRW service available for continental U.S., Puerto Rico and Hawaii—additional mileage charges may apply

1 - 8 0 0 - 4 6 8 - 9 0 4 4

in access for both Macs and PCs on Ethernet networks. *NetModem/E* can route both AppleTalk and Novell's IPX protocol, allowing Macs to dial into networks running *NetWare for Macintosh* or straight IPX. Similarly, PCs can dial into AppleTalk networks and access *AppleShare* servers, provided they are running software such as Farallon Computing's *PhoneNET Talk* or Shiva's \$99 *DOS Dial-In*.

LOW-COST LANS

Floppy disks and serial connections become cumbersome when you frequently need to transfer large amounts of data. Networks may be the ideal way to connect the PCs and Macs in your organization.

You can set up a low-cost network for this purpose or connect to an existing network through a gateway. In addition to file transfer, low-cost networks can give users access to Macintosh and PC printers, along with multiplatform electronic mail. Although these simple, relatively inexpensive networks do not provide as many bells and whistles as network operating systems such as *NetWare for Macintosh*, they offer enough functionality to meet the needs of many organizations. (For more information on high-end LANs, see "High-End PC-to-Macintosh LAN Solutions.")

Three low-cost networking products are available. The *TOPS* line of products, from Sitka (510-769-9669), features *MacTOPS*, \$299 to \$995 for up to ten users, and *DOSTOPS*, \$249 to \$995. Farallon Computing (510-596-9000) sells *PhoneNET Talk* for \$195. And DayStar Digital (404-967-2077) markets a network interface card called the LT200 Connection, from \$249 for an AT bus to \$399 for MCA. *TOPS* and *PhoneNET Talk* require adding a network interface card and software to the PC, while the LT200 Connection requires a node box. All use the Mac's built-in LocalTalk hardware. *TOPS* adds software to the Mac, while *PhoneNET Talk* and the LT200 Connection use

SYSTEM 7: Mac File Sharing for PC Users

by John Rizzo

Even diehard PC users know the Macintosh operating system for its easy accessibility. But this operating system also contains some connectivity features that enable PCs and Macs to access each other's files.

The most recent incarnation of the Macintosh operating system, Macintosh System Software, Version 7.0, adds a file-sharing feature that provides distributed file sharing without a centralized file server; Sitka's *TOPS* (510-769-9669) offers a similar feature. But unlike *TOPS*, System 7's file sharing complies with the AppleTalk Filing Protocol (AFP), the protocol stack that uniformly provides file-sharing services on AppleTalk networks.

Under System 7, each user can designate one or more directories, called *folders* in Mac lingo, to be shared on the network as AFP volumes. Macintosh and PC users with AFP-compliant software, such as Farallon Computing's \$195 *PhoneNET Talk* (510-596-9000), can mount this directory in the same way that they access other AFP volumes. Mac users access a shared folder as they do file servers; the folder appears as just another network disk icon. PC users can make the shared directory their D: drive. Copying a file to this directory puts a copy on the Mac user's hard disk.

You can assign passwords and several levels of access to shared Mac directories. For instance, Mac users can

set up drop folders, write-only directories to which one or more users are allowed to copy files. One caveat, though: System 7's file sharing is slower than that of a dedicated file server and should not be used as a replacement.

Apple left *extension mapping* out of its system software. Extension mapping allows an application to change Macintosh filenames automatically to the PC's naming conventions and vice versa. Fortunately, you can add extension mapping with an inexpensive utility. Any current Macintosh model can read from or write to a DOS or OS/2 disk in its floppy disk drive, either from within an application or through the use of a system software program called *Apple File Exchange*. But Mac users cannot use their familiar Desktop, the Mac's screen workplace, for this purpose.

DOS-mounting utilities added to the Mac System folder perform extension mapping when the Mac user copies files to a DOS disk. Two example utilities are the \$89.95 *DOS Mounter*, from Dayna Communications (801-531-0600), and the \$99 *AccessPC*, from Insignia Solutions (415-694-7600). When a Mac user gives you files on a disk, these programs enable your PC to see filenames it can handle. DOS-mounting utilities also mount PC disks as icons on the Mac's Desktop, so a Mac user can copy files between Mac and PC disks simply by clicking and dragging with the mouse. These utilities are true System extensions—unlike extension-mapping

software, which usually comes in the form of desk accessories.

DOS-mounting utilities also enable a Mac to read DOS-formatted, larger-capacity removable storage media, such as SyQuest, Bernoulli, and erasable optical cartridges. If your removable cartridge contains DOS partitions, the DOS disk-mounting utilities on the Mac recognize each partition as a separate Desktop volume. Some of the software drivers for SyQuest mechanisms will not mount on the Mac, but several DOS-mounting utilities get around this by supplying a universal driver formatter. With this formatter, Mac users can update the driver on the SyQuest cartridge, while keeping the data intact.

Logging on to a PC network operating system such as Novell's *NetWare* or Banyan Systems' *VINES* is not hard for a Mac user, and a feature of System 7 called *aliasing* makes it even easier. An alias is an icon that is a pointer to another file, directory, or volume. Double-click on the alias, and the file or directory opens. If you create an alias of a mounted server volume, the alias will remember the log-on procedure. Double-clicking on the alias will then perform the log-on automatically, prompting the user for any passwords.

Apple's System 7 makes interoperability between PCs and Macintoshes more automatic than ever. System 7's new features give the Mac even friendlier capabilities, this time benefiting Mac and PC users alike. ■

the networking resources built into the Mac operating system. *TOPS* is the more expensive but comes bundled with Data Viz's *MacLinkPlus Translators*. All offer distributed file service, as well as access to any Mac file servers, and all are based on AppleTalk, the networking system developed by Apple (see the sidebar "AppleTalk and the OSI Model").

Three LocalTalk cards for the PC are Farallon's *PhoneNET Card PC* (\$295, bundled with *PhoneNET Talk*), DayStar's *LT200 Connection*, and Sitka's *TOPS FlashCard* (\$239). Farallon's *PhoneNET Talk* works with Ethernet cards from 3Com and Token-Ring cards from IBM, and may expand to others in the near future. Sitka's *TOPS* will run on Ethernet and Token-Ring cards from Standard Microsystems Corp. and 3Com. Since *NetWare* supports LocalTalk, you can use the cards with *NetWare*, but you cannot mix LocalTalk and Ethernet on the same segment.

Of the three solutions, Farallon's is best. *PhoneNET Talk* provides more features than DayStar's *LT200 Connection*, and unlike *TOPS*, it requires no software on the Mac. Mac users work with the same interface they use for all other file sharing. With *TOPS*, you have to retrain the users. But *TOPS* works across many platforms. Sitka makes versions for Sun workstations and pen-based computers. *SunTOPS* costs \$1,295 to \$1,395. *PenTOPS* comes bundled with every copy of GO Corp.'s *PenPoint*, and *PenCentral* is licensed to third-party vendors.

Sitka also plans to merge *TOPS* with the *IONET* peer-to-peer PC network product line formerly owned by Digital Communications Associates and now co-owned by Tiara Computer Systems. Sitka has not announced a product name for the new line, which is supposed to ship by the end of the year, but it is calling the new architecture *OpenTOPS*. *OpenTOPS* will run on Unix and pen-based systems and be optimized for small mixed workgroups.

A GATEWAY TO MULTIPLATFORM NETWORKS

Low-cost LAN solutions are fine if you are not trying to connect to an existing Macintosh workgroup. But if a Macintosh network already exists, you can connect it to a PC network via a gateway.

MacLAN Connect, \$995 from Miramar Systems (805-966-2432), is a unique gateway product that runs on a PC and allows you to integrate individual or networked

APPLETALK AND THE OSI MODEL

by John Rizzo and Les Freed

What gives Macintoshes the ability to connect over a network? The answer is AppleTalk, which is shipped with every Macintosh.

AppleTalk is a complete protocol environment that forms the basis of all Macintosh networking. AppleTalk Phase 1, the original AppleTalk protocol, is limited to 254 nodes on one physical cable. AppleTalk Phase 2, the current version, has been around for about three years and can support over 16 million nodes.

Part of the beauty of AppleTalk is its modularity. AppleTalk maps cleanly into the Open Systems Interconnection (OSI) reference model. And with its modular design, AppleTalk greatly simplifies PC-to-Mac connectivity by enabling users to substitute industry-standard networking protocols at all layers of the OSI model, without affecting the remaining AppleTalk protocols.

THE OSI MODEL

Like the OSI model, the AppleTalk protocols define seven layers. At the bottom is the **physical layer**, which in native Macintosh environments is LocalTalk. The next layer, the **data-link layer**, ensures that the data moves reliably over this physical link.

LocalTalk is a 230.4-kilobit-per-second network built into every Macintosh, using Apple's relatively inexpensive shielded LocalTalk cable. Several third-party vendors make alternative LocalTalk connectors that use standard modular telephone cable, which can handle higher speeds.

Aside from LocalTalk, AppleTalk does support other communication schemes, namely Ethernet and Token-Ring (in Macintosh parlance, **EtherTalk** and **TokenTalk**, respectively). FDDI (Fiber Distributed Data Interface) network interface cards for the Macintosh may also be available by the end of the year.

After the physical layer and the data-link layer are the middle three layers of the OSI model. The **network layer** provides pathways between networks,

the **transport layer** finds the appropriate pathway on your local network, and the **session layer** allows applications to communicate across the network.

AppleTalk protocols exist at all of these layers. The network layer consists solely of the **Datagram Delivery Protocol (DDP)**, which handles the transmission of data packets over an internetwork connection.

Four AppleTalk protocols are in the transport layer. The **AppleTalk Transaction Protocol (ATP)** allows one process to ask another to handle some action and tell it the result. The **AppleTalk Echo Protocol (AEP)** lets a node transmit a data packet to another node and receive a copy. The **Name Binding Protocol (NBP)** creates tables containing the names that administrators have assigned to network devices, alongside their addresses. The **Routing**

OSI reference model	
Network services	LAYER 7: Application
	LAYER 6: Presentation
Logical connection	LAYER 5: Session
	LAYER 4: Transport
Physical connection	LAYER 3: Network
	LAYER 2: Data link
	LAYER 1: Physical

Table Maintenance Protocol (RTMP) lets routers update the tables they use to find the right path for delivering data between two points.

The session layer also has four protocols. The **Zone Information Protocol (ZIP)** tells the NBP where the network manager has grouped the parts of the network system. The **AppleTalk Session Protocol** is the main protocol in this layer; it handles setting up and taking apart the temporary connections between the server and workstation, while giving them a way to communicate. The **Printer Access Protocol (PAP)** manages the interaction between the Mac and the printer. The last protocol, the **AppleTalk Data Stream Protocol (ADSP)**, is used by some applications for peer-to-peer communication.

Other protocols can also run in the network, transport, and session layers,

such as *NetWare's* **IPX/SPX (Internet Packet Exchange/Sequenced Packet Exchange)** and the widely supported **TCP/IP (Transmission Control Protocol/Internet Protocol)**.

USER-LEVEL SERVICES

The top two layers of the OSI model supply network services directly to the user. This includes the way these services appear on-screen in the **presentation layer** and specific services such as print spooling and e-mail in the **application layer**.

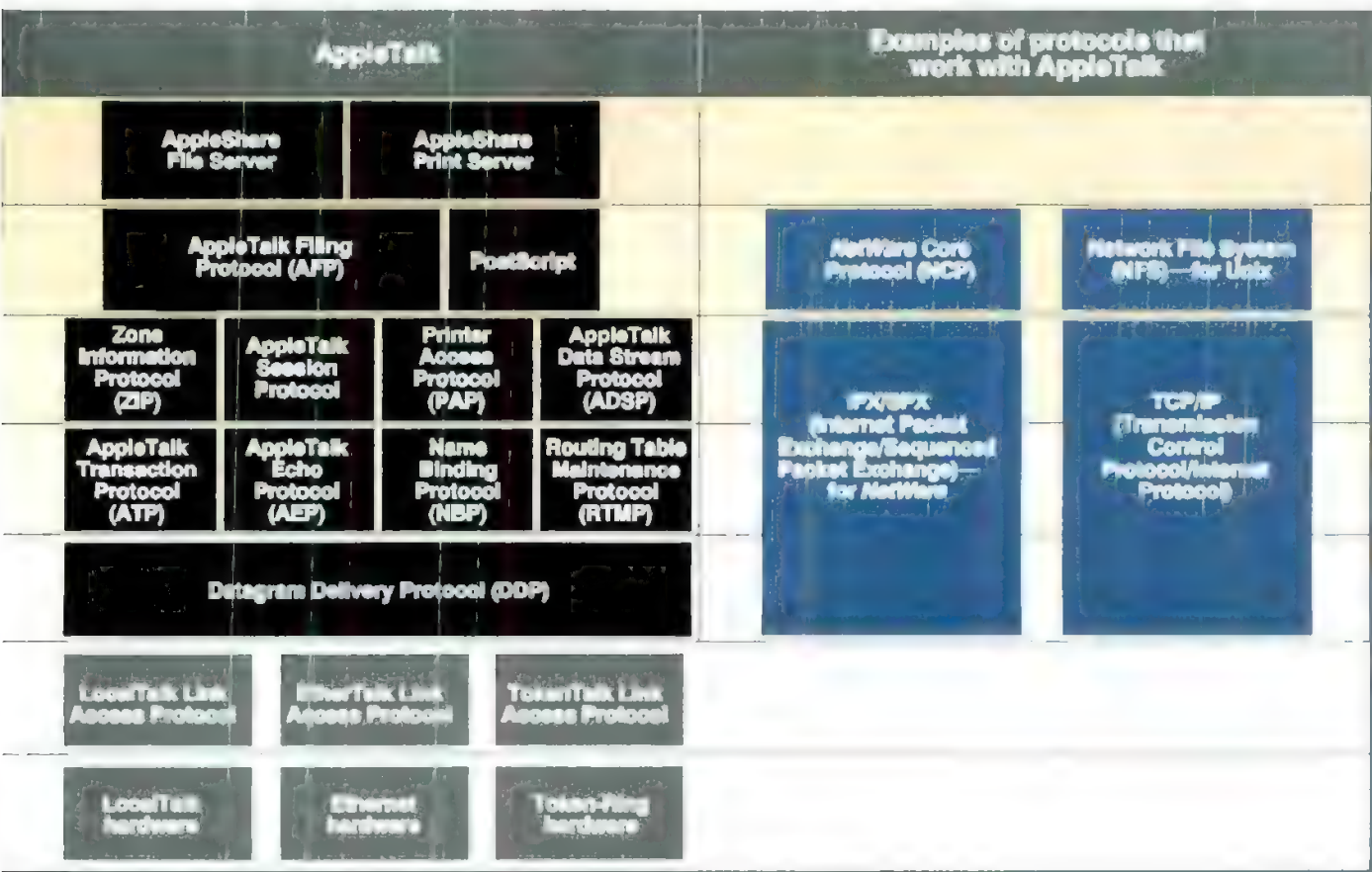
In the presentation layer, you can use the **AppleTalk Filing Protocol (AFP)** to share files and applications residing on the file server. **PostScript** provides a language for communicating with the network printer.

You can also translate high-level protocols, such as Sun's **Network File System (NFS)** for Unix, by using a

gateway product. Such a product can be built into the network operating system or sold as a third-party product.

At the application layer, you can run programs providing distributed file services for Macintoshes, such as Farallon Computing's *PhoneNET Talk*. At this layer you will also find **AppleShare File Server**, Apple's own AppleTalk-based file server product, along with **AppleShare Print Server**, which provides print-spooling services. The print server is part of **AppleShare File Server**, not a separate product, but the two are separate on the chart because they are different modules.

You could also run *NetWare* Loadable Modules (NLMs) or applications written for **X Window**, a graphical environment standard for Unix that is portable to other systems. Apple-Talk will interoperate with all of these schemes.



CONNECTIVITY

PC-TO-MAC CONNECTIONS

Macs into a variety of PC networks, including IBM's *OS/2 LAN Server*, Microsoft's *LAN Manager*, Novell's *NetWare*, Ungermann-Bass's *NetOne*, and many more. Because of the Mac's built-in LocalTalk networking features, it is fairly easy to connect a Mac to all of these networks simultaneously, but this depends on the type of PC you are using. You usually need to install two network cards in the gateway PC, one to run AppleTalk, the other to run the type of network to which the PCs are attached. *MacLAN Connect* accepts calls and commands from the Mac, interprets them, and makes the appropriate calls and commands on the PC side.

With *MacLAN Connect*, Macintosh and PC users can share common file servers and printers and send electronic mail; each platform gets access to the network services of the other, while using its own interface. *MacLAN Connect* also allows you to set up an *AppleShare*-compatible file server on a PC that is running OS/2 or DOS and access it from Macs and PCs alike.

Several gateway products are also available for connecting Macs on Ap-

pleTalk to TCP/IP networks in the Unix world. The GatorBox CS router/gateways, \$1,795 from Cayman Systems (617-494-1999), translate between the two protocol suites and can route TCP/IP, AppleTalk, and DECnet. The GatorBox CS can also run software to translate higher-level protocols: *GatorShare*, which lists for \$1,995, translates between AppleTalk Filing Protocol (AFP), Apple's file server protocol, and Network File System (NFS), the file-sharing protocol used on Unix networks. This allows Macs to access file servers on Sun, NeXT, PC, and other NFS-compatible computers. Other software from Cayman Systems includes *GatorPrint* (\$595) and *GatorMail* (\$595 for a ten-user li-

cense), which let Macs share printer and mail services with PCs running on Unix networks.

File-translation and file-transfer techniques make it possible to accept Macs as equal partners in everyday computing.

This is not to say that you will have no problems: File format translation can always be strengthened, and multiplatform file standards are only just beginning to appear. But Apple has done a good job of enabling the Macintosh to fit into DOS and OS/2 environments easily. Although support for Windows is still lagging, we should be seeing improvements later this year

that allow Windows users to connect to Macintoshes without first having to quit out of the Windows environment to go into DOS.

*File-translation
and file-transfer
techniques make it
possible to accept
Macs as equal
partners in everyday
computing.*



"Only PrintDirector gave us a cost-effective solution for every size work group & wiring configuration in our company."

Now make everyone who shares printers grin from ear to ear.

Send for your free

white paper. Get the story on the only manufacturer with a full range of models and wiring options to solve all your peripheral sharing problems. See why PrintDirector — with 600,000 users worldwide — was the '91 winner of *PC Magazine's* Editors' Choice award.

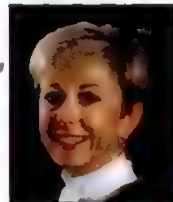
Discover how to print at up to 100,000 BPS using PrintDirector. And print right the first time — every time. For a price that will make you happy.

Flexible
Printer
Sharing
Solutions

FREE

"PrintDirector lets us print our graphics applications in about half the time of other products."

For your free white paper, free catalog and "Keep 'Em All Smiling" guarantee certificate, call:



1-800-243-2333 Ext. 98 (in MA 617-647-1234)



**DIGITAL
PRODUCTS, INC.**

the leader in printer sharing

411 Waverley Oaks Road, Waltham, MA 02154

PrintDirector is a registered trademark.

Printer sharing with PrintDirector is guaranteed to keep everyone smiling.



"With PrintDirector's easy file transfer capabilities, we saved a small fortune by not buying a LAN."



"Just plug it in and forget about it. PrintDirector feels like you're using a dedicated printer."



Choosy Motherboards Choose ZIF

From Northgate®, The i486™ Specialists

**Now! Upgradable
Across The Full 486 Range
Fast And Easy As 1-2-3**

1. Raise the lever which releases processor for lift-out removal.
2. Place the new CPU* into socket.
3. Lower lever which locks the CPU. Presto – blazing new speed!



- 486SX™/20 MHz Processor
- 4MB of RAM (expands to 32MB)
- 64K Read/Write Back Cache
- 52MB Hard Drive
- Choice of Floppy Drives
- 14" VGA Color Monitor
- 101 NI Keyboard



- 486DX/33 MHz Processor
- 4MB of RAM (expands to 32MB)
- 64K Read/Write Back Cache
- 240MB Hard Drive
- Choice of Floppy Drives
- 14" SVGA Color Monitor with Orchid Pro-Designer II Video Card
- 101 NI Keyboard

ZXP™ Systems – Unlimited Upgradability – 486SX/16 To 486DX2/50 – Three Cabinet Styles And Your Choice Of Networking Options

Confused by all the different Intel® processor models? Call Northgate. Our new ZXP ends your uncertainty. With our one "ZXP" system you can maximize Intel's full range of upgradable CPUs – you can use any of them.

Specify a 486SX/16 for your workstations. Later, upgrade them to SX/25...DX/33...DX2/50 and products Intel has yet to announce.

Look at the picture. Do-it-yourself ease and convenience for any upgrade. The secret is our ZIF (Zero Insertion Force) socket. No prying and pushing. No special tools needed to handle delicate, expensive chips. Once again Northgate has thought it through and brings you a spectacular

new range of systems with today AND TOMORROW firmly in mind.

When it comes to economy, Northgate's Elegance™ ZXP leads the industry. The entire range represents the ONLY fully upgradable 486 systems available.

And the ZXP line is backed by legendary Northgate tech support, customer service and warranty programs with up to three years of extended warranty available (option). Need tech help? Just call us 24 hours a day, every day. And you'll get a knowledgeable, live person.

No matter how you value it, Northgate and ZXP are your choice for the best combination of computer solutions money can buy.

Call for complete pricing and custom configuration information.

800-828-6125

Major corporations, volume purchasers and government agencies call National Business Accounts: 800-545-6065

Charge it to your VISA, MasterCard, Discover, American Express or Northgate Big "N" Card.

**New Northgate ZXP Systems Work
With Intel SX...DX...And Speed
Doubler Processors**

**NORTHGATE
COMPUTER
SYSTEMS, INC.**

7075 Flying Cloud Drive, Eden Prairie, MN 55344





Your business is safe with us.
Especially when it's really taking off.



Wherever you're growing, now you can get to over a gigabyte of capacity. Our new 3M Magnus™ 1.0 and 1.35 data cartridges are just the start to a whole new generation of increasing data cartridge speed and capacity. We're ready when you are.

That's why more business protects important information on 3M brand diskettes and data cartridges than any other brand in the world. Call 1-800-888-1889 ext.7 to find out more.

Innovation working for you™

3M Magnus 1.0 and 1.35 data cartridges require a compatible drive. © 3M 1991
Magnus is a trademark of 3M.

3M | 
Worldwide Sponsor 1992 Olympic Games
3M SC-380

CIRCLE 167 ON READER SERVICE CARD

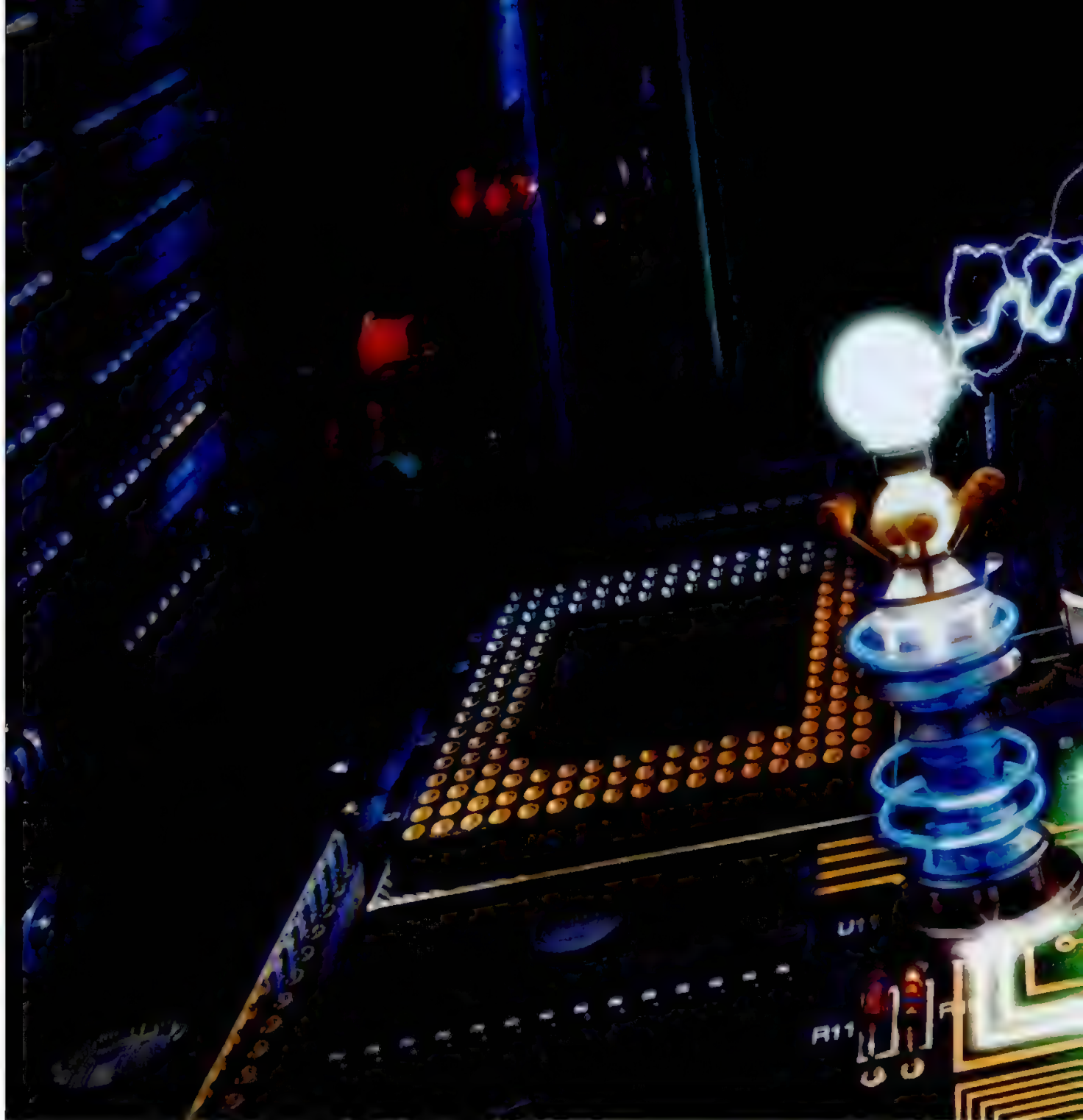
HIGH-END PC-TO-MAC LAN SOLUTIONS

By Les Freed

When corporations need to build enterprise-wide networks that encompass both PCs and Macs, they turn to Microsoft, Novell, and Banyan Systems. Here is a look at how the big three stack up.

The Big Three network vendors have given the Macintosh much needed attention. Microsoft, Novell, and Banyan Systems now offer Macintosh connectivity solutions as extra-cost options to their basic network operating systems, enabling file and printer sharing and e-mail messaging between PC and Macintosh users. All three vendors have set out to make Macs equal partners on the network; all three provide industrial-strength products, and their Macintosh options carry a price tag to match. Banyan's *VINES Option for Macintosh* costs \$1,995 per server with unlimited users, Microsoft's *LAN Manager Services for Macintosh* sells for \$995 for 50 users, and Novell's *NetWare for Macintosh* is

ILLUSTRATION: DON BAKER

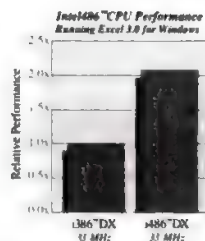


The affordable power sou



Today's user-friendly software demands a lot of power to really be friendly. And now you can give it the Intel486™ power it needs for a friendly price.

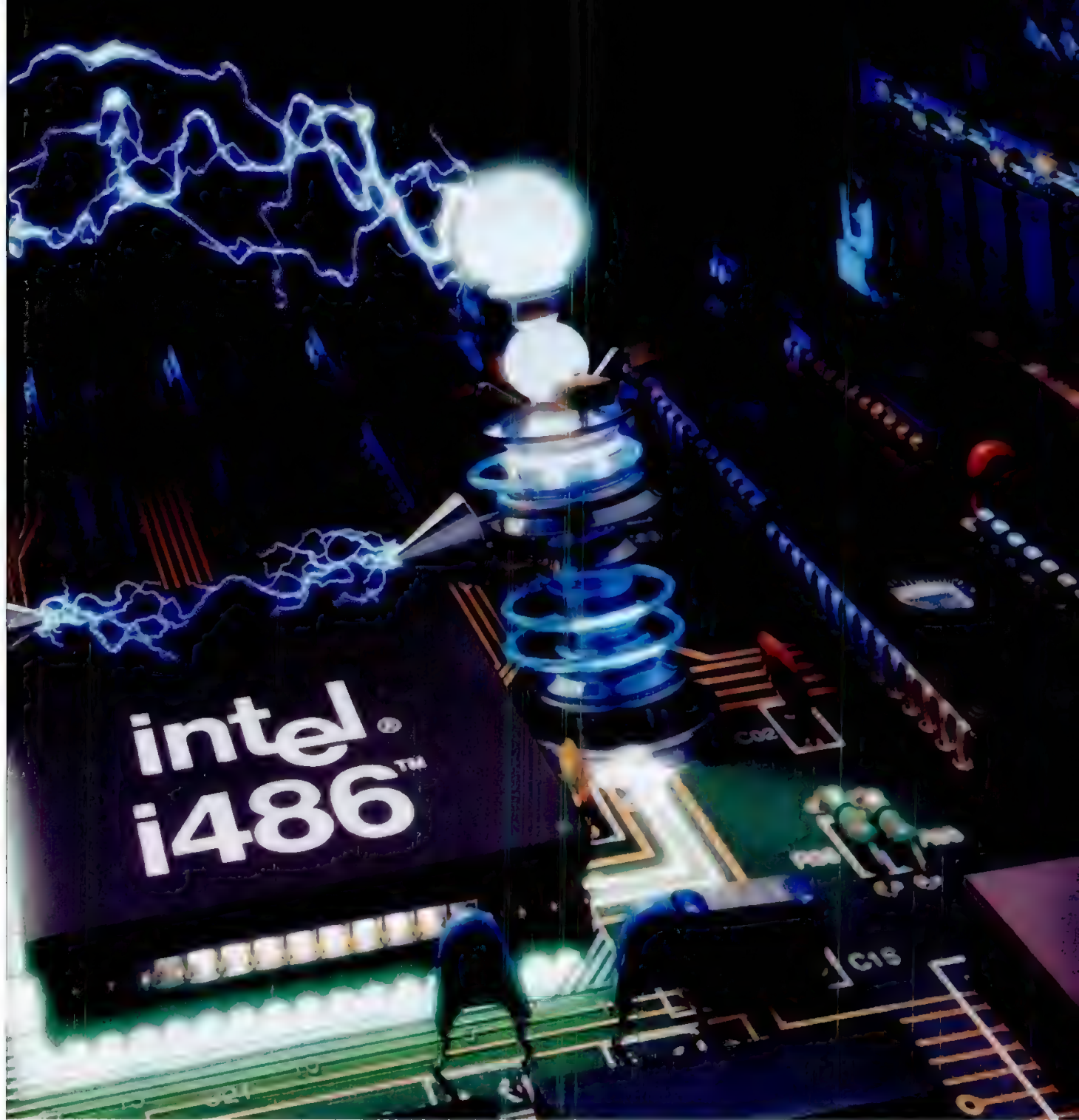
With an Intel486 microprocessor inside, you can take full advantage of today's graphical software. In fact,



where other systems get bogged down, like running multiple Windows® applications simultaneously, the Intel486 CPU powers through these kinds of challenging operations easily.

Plus, the Intel486 CPU will keep

Intel486, i486, i386 and the Intel Inside logo are trademarks of Intel Corporation. ©1992 Intel Corporation. The chart is Byte Magazine's Excel 3.0 for Windows benchmark.
*All product names are trademarks of their respective manufacturers.



power for today's software.

generating the power you need beyond today. Because the next generation of operating system software—like Windows NT®, OS/2®, Solaris® and NextStep/486®—also needs the power of the i486 CPU.

Ready to get the most out of your windowing software? Then call (800) 228-4549 for a free brochure on the

new standard in desktop computing—the Intel486 family. And plug your software into a real power source.

intel®

The Computer Inside.™

CIRCLE 374 ON READER SERVICE CARD

CONNECTIVITY

PC-TO-MAC CONNECTIONS

priced at \$895 for 20 users and \$1,995 for 100 users. You add in the cost of the rest of the network operating system on top.

What you get for your money is convenience and a computing platform on which you can build sophisticated client/server applications. Macs can store files on the same servers as PCs, and all users can share the same printers. This makes life easier for everyone: Network managers can cover Mac and PC users with one backup, and network users can move files between the two platforms without problems. While some low-cost LANs such as Sitka's *TOPS* and Farallon Computing's *PhoneNET Talk* allow you to put PCs and Macintoshes on the same network, they do not provide native hooks into corporate servers running under *LAN Manager*, *NetWare*, or *VINES*.

In contrast, the add-on products from Microsoft, Novell, and Banyan are well suited for corporations that have already invested in their network operating systems. If you do not already have *LAN Manager*, *NetWare*, or *VINES* installed, lower-cost options are available. LocalTalk, the Mac's built-in networking system, provides a serviceable if not speedy way to share files and peripherals at a relatively low cost. But LocalTalk theoretically runs at a maximum speed of 230.4 kilobits per

second (Kbps). Compare this with the AT floppy disk controller, which reads data at 500 Kbps. But since the disk controller also has to take time to seek and access data, the speeds come out about the same. Keep in mind, however, that graphics-

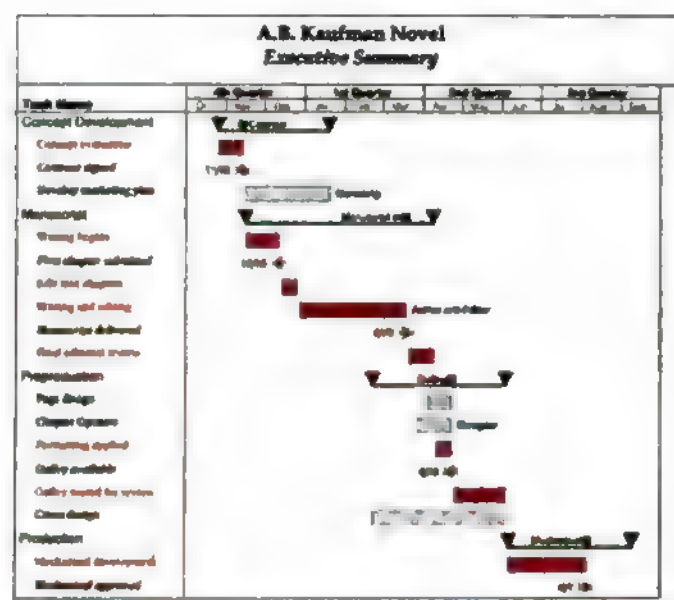
based applications tend to create very large data files. If you need to move large files, such as those created by *PageMaker*, you will find that LocalTalk quickly runs out of horsepower. Ethernet theoretically runs at 10 megabits per second, or about 40 times the speed of LocalTalk. You can take advantage of this by running AppleTalk over Ethernet hardware to give you an EtherTalk setup. In raw throughput, however, you will find Ethernet to be only about 4 to 5 times as fast as LocalTalk.

As an informal test, we connected a Macintosh IIfx to our test-bed LAN via a Dayna Ethernet board. We then copied a Mac folder containing 4.1MB of data to a *NetWare* file server. It took the Mac 1 minute 5 seconds to copy the test files (a throughput rate of about 500 Kbps). We then deleted the files and reconnected the same Mac to the network using LocalTalk. The same group of files took over 4 minutes to copy via LocalTalk (a throughput rate of about 125 Kbps).

THE MAC WORKSTATION SOFTWARE

Due to Apple's commitment to make every Macintosh network-ready, every Mac

The CEO wants to know when it will be finished.



CONNECTIVITY PC-TO-MAC CONNECTIONS

comes with Apple's *AppleShare Workstation*. In PC terms, *AppleShare Workstation* is the equivalent of the DOS client PC network software. Tightly integrated into the operating system, *AppleShare Workstation* handles network disk and printer redirection chores with typical Macintosh simplicity.

Once you connect a Mac to a network drive, the drive appears as an icon on the Mac desktop, just like a local hard disk or floppy disk drive. Users can drag files to and from the network, just as with local disk drives. Network printers appear in the Mac's Chooser dialog just like locally attached printers. The beauty is that you use the same workstation software regardless of the type of server or network cable. While researching this article, we successfully connected a single Mac workstation to *LAN Manager*, *NetWare*, and *VINES* servers using only the standard Mac workstation software.

WHOSE FILE IS THIS?

All three network operating systems automatically truncate long Mac filenames into legal DOS filenames, but they do it in a slightly different fashion (for more in-

formation, see the sidebar "Naming Names: The Mac File Format"). As a test, we created two *Word for Macintosh* files named "This is a long file name" and "This is a long file name, too." The table below shows how the three operating systems handled this challenge:

	LAN Manager	NetWare	VINES
This is a long file name:	thisisal.ong	thisisal.	!this_is._a
This is a long file name, too.:	thisisal.ine	thisisa0	!this_is._a0

All three products discarded the comma and spaces, which are not allowed in DOS filenames. Each converted the long Mac filename to a unique DOS filename with varying degrees of readability.

LAN Manager Services for Macintosh and *VINES Option for Macintosh* include a facility to map DOS file types to a specific Mac file type and creator. This allows DOS files to appear to Mac users as a familiar icon, and it allows Mac users to open the file by clicking on the icon. Both programs include a predefined list of file types and creators; you can add your own

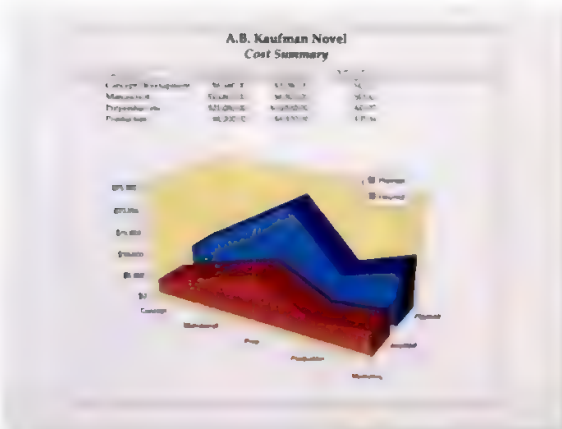
to the list as necessary. Using this feature, the network operating system automatically fills in the type and creator information as new DOS files are created on the network. *NetWare for Macintosh* lacks this feature. If you want DOS files to have a Mac creator and type under *NetWare*, you will have to edit each file with Apple's *ResEdit* or a similar Mac file utility pro-

gram. The Macintosh operating system does not have extension mapping built in.

SHARING PRINTERS

One of the major benefits of a network is the ability to share printers. Despite popular misconceptions, most Apple LaserWriter printers are basically vanilla PostScript printers. There is nothing proprietary about them. In fact, the original LaserWriter was the first PostScript printer on the market. Many PostScript printers from other manufacturers include the same set of fonts as the Apple printers in order

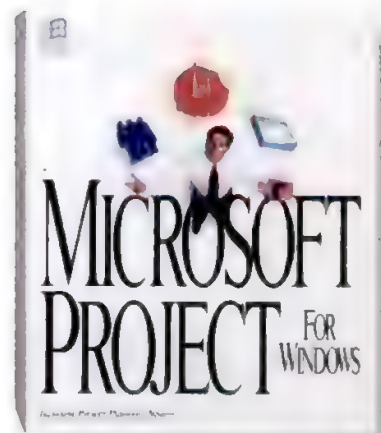
The controller wants to know how much it will cost.



to the functions you use most with a click of the mouse. While *PlanningWizards* give you online assistance to help develop plans.

What's more, new *Microsoft Project* has WYSIWYG and Multi-Page Print Preview, so plan on visiting the printer less.

We want to know what you're waiting for.



For your upgrade or the name of a reseller, call (800) 541-1261, Dept. X19. You'll satisfy a lot more people. Including yourself.

Microsoft

Introducing Z-NOTE.



The Z-NOTE series starting at **\$2599**. Call now 1-800-523-9393.

The future is built in.

Generations Ahead

While the others are busy imitating the SL-notebook design we shipped last July, Zenith Data Systems is thinking two generations ahead. Our new Z•NOTE brings a new genius to power management: *over four hours* of non-stop high-performance computing power. And our new "lid rest" feature allows you to close down without shutting down. It's simple, and it's just the beginning.

Notebooks Meet Networks

The Z•NOTE introduces notebooks to networking. *Built-in* networking. Believe it. We've put Ethernet on the motherboard. And we've pre-installed client shells for Microsoft® LAN Manager,™ Novell NetWare® and Banyan® VINES®. Take your pick.

We've Seen The Future And It's In Color.

Our new active-matrix color display is a knockout. And the real beauty of it is that you can start with our high-contrast black-on-white model and upgrade to color in the future. In minutes. It's worth waiting for.

Who Needs A Docking Station?

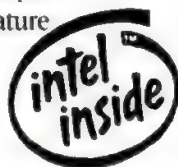
Just snap on the optional, inexpensive READYDESK™ Port Replicator and you have instant access to all your office peripherals. It's pretty neat. It's Z•NOTE.

Practice Makes Perfect

There's no more-thoroughly-thought-out SL notebook on the market. Microsoft Windows™ 3.1 is pre-installed. The Logitech® TrackMan® Portable Mouse is included. LCD/CRT video is simultaneous. And the optional data/fax modem works worldwide. You won't get that kind of thinking from the rookies. It's called Thinking Ahead. And we're used to it.

Call 1-800-523-9393.

Reseller prices may vary. But call ahead. We'll tell you how we can guarantee prices on all four models. When you're Thinking Ahead, you think of everything.



320L		325L		325Lc	
i386®SL-20 MHz		i386SL-25MHz			
60MB HDD		85 or 120MB		120MB	
10.0" (9.5" v) VGA black-on-white display upgradeable to active-matrix color				8.4" VGA color	
5.9 lbs.* *incl. nickel metal-hydride battery				6.5 lbs.*	
4 hours continuous power, max 10 hours under Z•NOTE Premier System Management.™ Expect about 1/3 less with color.					
ETHERNET NETWORK-READY Microsoft LAN Manager, Novell NetWare and Banyan VINES client shells					
WINDOWS-READY MS-DOS® 5.0 with APM/Microsoft Windows 3.1 Logitech TrackMan Portable Mouse					
UPGRADE OPTIONS Memory, BIOS, HDD, FDD, Co-Processor, Display					

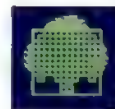


320L \$2599

325L \$3099
Model 85

325L \$3599
Model 120

325Lc \$5299



ZENITH DATA SYSTEMS

A Bull Company

Thinking Ahead.

Resellers determine their own pricing which may be higher or lower than Zenith Data Systems advertised prices. All prices and specifications are subject to change. Prices are for models shown, in U.S. dollars. Shipping, handling, and applicable sales taxes not included in the price.

Z•NOTE, READYDESK and Premier System Management are trademarks of Zenith Data Systems Corporation. Microsoft, LAN Manager, MS-DOS, Windows and the Ready-To-Run logo are trademarks of Microsoft Corporation. Logitech and TrackMan are trademarks of Logitech, Inc. The Intel Inside logo and i386 are trademarks of Intel Corporation. NetWare is a trademark of Novell, Inc. Banyan and VINES are trademarks of Banyan Systems, Inc. Copyright © 1992 Zenith Systems Corporation.

14,400 bps DATA
14,400 bps FAX
Voice*
Caller ID*
5 Year Warranty
\$399⁹⁵



Are We Connecting Yet?

Introducing the amazing new SupraFAX-Modem™ V.32bis! On the fax side, it has 14,400 bps send and receive fax, Class 1 and 2 commands, and compatibility with the millions of Group 3 fax machines in use. On the data side, it connects at 300 to 14,400 bps and provides up to 57,600 bps throughput with V.42bis compression.



Supra Corporation

(It has MNP 2-5 and 10, too.) Plus its revolutionary display gives you 25 different status reports! And for just a little more, you can easily add caller ID and voice capabilities

later this year. In addition to the \$399⁹⁵ stand-alone version (without software), SupraFAXModems are available in Windows™, DOS™, and Macintosh™ packages.

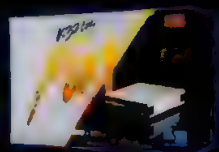
9600 bps Version
\$299⁹⁵

1-800-727-8417

7101 Supra Drive S.W., Albany, OR 97321 USA • 503-967-2410 • Fax: 503-967-2401

* Low-cost, user-installable Voice & Caller ID upgrades available Q2 '92.

All trademarks belong to their respective companies.



to maintain complete plug-and-play compatibility with Apple's printers. The early LaserWriters did not provide a parallel port and were not widely used in the PC universe. Later models added a parallel port, and the newest models also include a SCSI port.

In an all-Apple world, most LaserWriters or compatibles connect to their host Macs via LocalTalk cabling. LocalTalk was originally designed to let several Mac users share one or more LaserWriters.

All three LAN operating systems reviewed here provide a facility to share PostScript printers among all LAN users. PC users can gain access to formerly Mac-only PostScript printers, and Mac users can send output to any other PostScript printers attached to the network. Instead of printing directly to the printer, users normally print to a network printer queue. The server then generally holds the incoming print jobs in the queue and sends them to the printer on a first-in, first-out basis. Users can go about their work while the server waits for the printer.

APPLESHARE ON SERVER AND CLIENT

Support for AppleShare helps these products to share printers. AppleShare File Server is Apple's own AppleTalk-based file server product. It runs on a Macintosh and turns the Mac into a file and printer server. The client Macs run AppleShare Workstation, the companion piece to AppleShare File Server. AppleShare uses AppleTalk Filing Protocol (AFP) to provide file services over the network and AppleTalk Print Services (ATPS) for printer services. All three products we tested use AFP and ATPS.

The three products in this review also support AppleTalk Phase 1 and Phase 2. (For more information, see the sidebar "AppleTalk and the OSI Model.") In essence, these products use the AppleTalk protocols to mimic a "real" AppleShare server.

AppleShare defines a simple but effective set of three possible file security rights: See Folders, See Files, and Make Changes. If you are the owner, or creator, of a

particular file or folder, then you automatically have all three security rights to that file or folder. You may grant each of the three rights to other users by user name or by group. AppleShare networks also

provide for guest logons, allowing any user to log on to any AppleShare network, even if the user does not have an account. Guest users automatically belong to the group Everyone.

From the Macintosh end of the network cable, these products are more alike than different. All three provide a similar suite of network services, and

because all use the AppleShare Workstation on the Mac end of the connection, they work exactly alike. The major differences occur at the installer's or administrator's corner of the network.

LAN Manager Services for Macintosh

Microsoft wants to be your LAN company—badly. But after investing several years and millions of dollars, Microsoft has not put much of a dent in NetWare's market share with LAN Manager. Recently, Microsoft introduced LAN Manager Services for Macintosh, Version 1.0, priced at \$995 per server. Although it lacks an administration program for the Mac, the program performs well, and its excellent extension-mapping facility makes sharing files among PCs and Macs a breeze.

By adding Macintosh support to LAN Manager, Microsoft hopes to broaden its appeal. The company recently reaffirmed its commitment to LAN Manager and outlined plans for a massive marketing campaign. But LAN Manager for Mac works only with Version 2.1 of LAN Manager; users of earlier versions will have to upgrade if they want to add Mac users to their networks.



LAN Manager Services for Macintosh, Version 1.0

Microsoft Corp., One Microsoft Way, Redmond, WA 98052; 800-227-6444, 206-882-8080.

List Price: 50 users per server, \$995.

Requires: Server: 8MB RAM; LAN Manager, Version 2.1. Macintosh workstation: Apple's System 6.03 or later; AppleShare Workstation, Version 2.0 or later.

In Short: A good performer that is easy to use, LAN Manager Services for Macintosh merits consideration for new networks. But it lacks an administration program that runs from the Macintosh.

CIRCLE 462 ON READER SERVICE CARD

LAN Manager for Mac provides an excellent file extension-mapping facility. PC files stored on the network appear to Mac users with their correct file type and file creator information; this allows Mac users to open the PC data files by clicking on an icon. For example, if you are using Microsoft Excel on your Macs and PCs, Mac users will see .XLS files as Excel icons. LAN Manager for Mac comes with several file types predefined, and you can add or delete other file types as needed. The product can also act as a full AppleTalk Phase 1 or Phase 2 router.

LAN Manager for Mac offers several file- and printer-sharing features. Like the other two products we tested, it uses Apple's AppleShare Workstation on the client Macs, and it lets Mac and PC users share any PostScript printer. PC users can access printers connected by AppleTalk, while Mac users can send output to serial or parallel printers attached to the file server.

LAN Manager for Mac includes a MACADMIN program to perform all Mac volume and printer management. There is no corresponding Macintosh application; you must do all administrative chores on the server or on an OS/2 or DOS machine attached to the network.

LAN Manager for Mac installs on a LAN Manager server in about 15 minutes. Like NetWare, LAN Manager supports AppleTalk connections via LocalTalk, Ethernet, and Token-Ring cable.

Micro WAREHOUSE



MICROSOFT
WINDOWS
COMPATIBLE

MicroWarehouse is the leading source for all your Windows needs! You can depend on us for fast, reliable, overnight service.

* Denotes Windows Compatible Products

OVERNIGHT
DELIVERY
ONLY \$7.00

NEW

\$75

Smartcom Exec 2.1

Smartcom Exec - Powerful communications software that combines terminal emulations, error-control protocols, and a text editor to meet the needs of virtually any user. Special modem control supports all popular PC modems. In a LAN environment, Smartcom Exec supports modem sharing on many popular asynchronous communications servers. To maximize communications flexibility, the program provides options for installation in one or more languages (English, Spanish, Italian, French, or German) and multi-language user documentation. The combination of popular terminal emulations, error-control file transfer protocols, a full-featured text editor, SCOPE scripting language, keyboard macros, mouse control, and many more features make Smartcom Exec the ideal communications program for business and home use. **Publisher: Hayes CM0294**

*WinSleuth Professional 2.0

This new version takes advantage of Windows GUI. Over 40 new features include tests on serial ports, mouse, keyboard, video adapter, RAM, and hard disk drive within the Windows environment, hard disk space utilization; low-level disk details; partition table; VGA information and memory



statistics under DPMI; view DOS level info such as environment details, TSRs, I/O port usage, system resources, device drivers and task list. **Publisher: Dariana Technology Group, Inc. UT1704**

\$105



*Lotus 1-2-3 & AmiPro 2.0 Double-Up Upgrade for Windows

If you're using any version of Lotus 1-2-3 or any Lotus word processor, including AmiPro, Ami, Samna Word IV or Manuscript, you can upgrade to both Lotus 1-2-3 for Windows and AmiPro 2.0 for Windows for one incredibly low price! Simply send or fax us the cover page from your user's manual of 1-2-3 or any Lotus word processor, along with the serial number on your disks (where available), and get these two power-packed Windows products for only \$199! You save \$569 off the MicroWarehouse regular price of the two programs (if purchased individually without the upgrade). **Publisher: Lotus**

Also available: Lotus 1-2-3 & Freelance Graphics Double-Up Upgrade for Windows \$10213/5 \$199.

Lotus 1-2-3 & AmiPro 2.0 Double-Up Upgrade for Windows \$10153/5

\$199

*Close-Up 4.0 for Windows & DOS

Winner of PC Magazine's "Editors' Choice", "Best of 1991", and PC WORLD'S "Best Buy."

Close-Up 4.0 lets you take control of PCs miles away by modem. Remotely view & operate multiple Windows, DOS and VGA/EGA graphics applications with record-breaking speed. Run your office PC from home or on the road via laptop. Help others at any location. Access networks. Fastest remote screen & file transfers. Remote mouse control. Limited Time Offer! Get Close-Up 4.0 Dual Pack (Both host & remote sides). **Publisher: Norton-Lambert CM0503/5**



\$119



*WinTools

The interface you bought with Windows was a big step forward from the DOS prompt. WinTools leverages your investment in Windows. You get what you expect from a completely object-oriented graphical user interface, clearly, simply, and intuitively. WinTools visually simplifies the needs of the first time user, while providing unmatched customization and automation for experienced users. Expand drag and drop to its full potential. Create easy-to-understand CUSTOMIZED ICONS. Automate functions with keystroke macros. Organize functions on up to 16 virtual screens. **Publisher: Tool Technology Publishing UT2253**

\$125



*Aldus PhotoStyler™

Aldus PhotoStyler is the most powerful and versatile Windows color image processing program available for the creative professional. It lets you acquire photographic images from a wide range of sources and in many industry-standard file formats, and then enhance them or modify them for use in publications or presentations. You can even create original images using PhotoStyler's extensive painting and effects tools. **Publisher: Aldus GR5034 \$549.**

*Aldus FreeHand®

Aldus FreeHand combines an elegant interface, powerful features, and superior output quality to give you the easiest-to-use tool for creating simple or sophisticated graphics. From black-and-white laser output to full-color prepress production, Aldus FreeHand is the most comprehensive design and illustration package for Windows. **Publisher: Aldus GR3043/5**

\$399

AUTOMAP

AUTOMAP helps you find the best route for your trip. It's fast, fun and informative with hundreds of up-to-date color maps. It searches its database of nearly 400,000 miles of roads to find the best route for your requirements. It even lists alternate routes and prints a map for you.

AUTOMAP's driving instructions list all the roads you'll be travelling, exactly how far to go, exactly where to turn and even the signs to look for. **Publisher: AUTOMAP, Inc. BS5224**



\$50

*CorelDRAW! 2.0

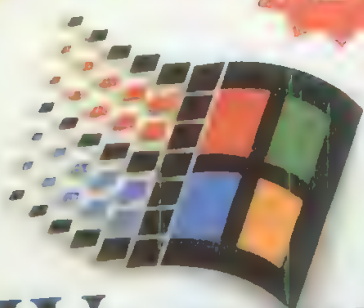
CorelDRAW! 2.0 is the PC graphics software for everyone. It's fun and it's powerful, and the winner of over 40 international first place awards! CorelDRAW! gives you incredible type control, superb drawing power, and stunning special effects in a value-packed program. It comes with over 150 fully scalable outline fonts (which can be converted for use with Adobe Type Manager), over 1000 clipart images and symbols, dozens of fill patterns, dotted and dashed line styles, and Arrowheads. 51 import/export filters, a free Pantone license, and free utility programs - CorelFRML, WINBROS, and Mosiac. Windows 3.0 or OS/2 required. Also available on CD ROM CD0220 \$445. **Publisher: Corel Systems GR0543/5**

\$369



Upgrade
Overnight!

NEW



Microsoft
WINDOWS

Operating System Version 3.11

Upgrade To Windows 3.1

for only **\$39**

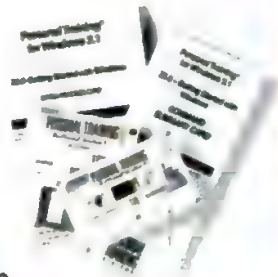
and get these Valuable Extras

FREE!

*Make Windows even easier with this Personal Training Systems tutorial. It's like having an expert sit beside you. It's **FREE** with **ANY ORDER** from MicroWarehouse. You pay only \$2.00 shipping and handling. Ask for item #AA0004 when you place your order.

Upgrade packaging not shown. Proof of ownership required for upgrade. Mail or fax us the first page of the user manual, or mail us your original program disk. Overnight delivery charge is \$7 and requires faxed proof of ownership.

Windows 3.1 Full Product Price \$89



SAVE \$500!

Order your copy of Microsoft Windows 3.1 from MicroWarehouse and get our fabulous bonus Coupon Book! It's packed with over \$500 in manufacturer's rebates on more than 25 of the most popular products for your PC. It's an incredible value, and it's yours **FREE** with your order for Microsoft Windows 3.1 (upgrade or full product) from MicroWarehouse.

THIS
Micro
SUPER VALUE
MONEY
SAVING
COUPON BOOK
IS WORTH
OVER
\$500
IN CASH REBATES!

FontBank™ Type Companion

250 Adobe Type 1
PostScript display
typefaces add punch to
your headlines and
presentations.
Includes traditional
decorative, specialty,
novelty, script, brush
and calligraphic faces.
Use anywhere display
typefaces are appropriate.



Donald Will Harris, internationally known typographic artist, has created the absolute best collection of PostScript display typefaces. Windows 3.1 required. Works with Adobe Type Manager 1.0 and SuperPrint 2.0. Compatible with CorelDRAW WFN80N. Publisher: FontBank, Inc. GR2823

\$99



Leading Edge 386/SX 16MHz VGA Complete Color System

The new Leading Edge 386/SX 16MHz VGA Complete Color System is a complete system for your PC. It includes a 386SX 16MHz processor, 1 MB of RAM, and a 1.2 MB 5.25-inch floppy disk drive. It also includes a 101-key keyboard, a mouse, and a 1.2 MB 5.25-inch floppy disk. It comes with a 101-key keyboard, which features 12 function keys for one-button operation, plus a mouse. You also get a 1.2 MB 5.25-inch floppy disk. Windows 3.1 required. Manufacturer: Leading Edge. BN0170

\$999

Micrografx Designer 3.1



Micrografx Designer is the premier drawing application. It features a design palette, a palette, and a palette. It's now seamlessly integrated with Adobe Type Manager. Adobe Type Manager and over 175 Type 1 fonts, creating a tremendous value. Features include: Bezier curves, perspective, and other designer tools. Other designer tools include: associative dimensioning, object snap, user definable margins, page size, and more. 132 x 132 layers, and over 18 line art styles. Showshow and Teletext programs included. Publisher: Micrografx. GR2783

\$485



Call for
overnight
upgrades!

I'm Kerry, call me at:
MicroWAREHOUSE

1-800-367-7080

(1-800-DOS-7080)

Inquiries: 908-370-0518 Fax#: 908-905-5245
Order Toll-Free 24 Hours a Day, 7 Days a Week

Free Micro Warehouse Catalog Subscription 2PM051
1690 Oak Street, P.O. Box 3014, Lakewood, N.J. 08701-3014
Fill out and mail this coupon to receive a free, one-year subscription to the MicroWarehouse catalog.

Name _____
Address _____ Apt. _____
City _____ State _____ Zip _____
(Expect to receive your next issue within 4-6 weeks)

You can now contact MicroWAREHOUSE or place orders with us in the Electronic Mall on CompuServe. The MicroWAREHOUSE GO code is GO MCW. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

Micro WAREHOUSE

OVERNIGHT
DELIVERY
ONLY \$7.00

Item numbers ending in 3 and 5 denote products available in 3 1/2" and 5 1/4" formats respectively. Item numbers ending in 4 denote that both formats are included. Please refer to item numbers when ordering.

Windows-compatible products

COMPUTERS & MEMORY

Loading Edge		
BN0170	D3SX 386-16 VGA Bundle	999
CP0160	D/LT 386SX Plus Laptop	1695
CP0240	60MB Notebook	
CP0240	60MB Notebook	1769
Memory		
	SIPPS SIMMS DRAMS	Call
MY0010	SIMM 256K 100ns	21
MY0013	SIMM 1MB 100ns	55
MY0005	SIMM 1MB 70ns	63
MY0004	SIMM 1MB 80ns	59

EXPANSION & UPGRADES

ATI Technologies		
EX2020	ATI B514 Ultra	565
EX2010	VGA Stereo FX	325
Avision		
EX1940	Desktop TV VG1	299
Boca Research		
EX1840	BRAT90 with BK	115
Brown-Wagh		
EX1510	MIDI Connector for SoundBlaster	59
EN0910	Sound Blaster	115
EX1800	Sound Blaster Pro	199
Digital Vision		
EX1155	ComputerEyes Pro Series	359
EX1610	ComputerEyes Color/RT	529
Media Vision		
CO0320	Multi Media PC Upgrade Kit	829
EX1580	ProAudio Spectrum	259
Persona Technologies		
EX2060	PC Speakers	179
Stac Electronics		
EX1480	Stacker 2.0	85

MEDIA & ACCESSORIES

Disks (boxes of 10)		
	BASF, Sony, Maxell and bulk Fuji	Call
Kensington		
AC0140	Masterpiece Plus	95
LB Innovators		
	Various Colors Wrist Saver w/MousePad	21
	Various Colors Wrist Saver	13
	Various Colors Wrist Saver MousePad	13
Targus		
AC2340	Premier Leather Case	169
AC0670	Universal Notebook Case	66

DRIVES/CD ROM

Imagemaster		
DR2050	Bernoulli 90MB Cartridge	145
DR1970	Bernoulli 90MB Transportable	799
MicroSolutions		
DR1240	backpack 1.4	210
DR1790	backpack 2.8	249
Plus Development		
DR1250	HardCard II XL 105 MB	469
Teac		
DR0910	Teac 3.5 1.44 FD	75

PRINTERS & CARTRIDGES

Adobe		
BN0080/70	Adobe PostScript Cartridge with Type Cartridge 1 or 2	299ea
	*ATM Plus Pack	125
Canon		
PR1710	Auto Sheet Feeder for BJ-10e	72
PR1500/70	Bubble Jet BJ 10e	325
PR2240	Bubble Jet BJ - 300	459
PR2230	Bubble Jet BJ - 330	599
Citizen		
PR2320	GSX-140 Plus Color Printer	339
IQ Engineering		
PR0610	Super Cartridge 2	269
PR1950	Super Cartridge 3 Pro	299
Pacific Data Products		
PR1120	25 Cartridges in One!	269
PR0910	Pacific 4 Memory w/2Mb	145
PR0490	PacificPage w/1 2/4 Plus 2mb	375
Panasonic		
PR2200	KX-P1124 Printer	299
PR2190	KX-P2624 Silent	469

MODEMS & FAX BOARDS

Cardinal		
MM0520	Internal 2400 Bd. Modem	60
MM0670	Int. 2400 Bd Modem w/6900 Send/Rec Fax	99
MM0270	Int. 9600 Bd. Modem w/V.42 BIS. MNP	329
Hayes		
CM0294	Smartcom Exec 2.1	75
MM0530	OPTIMA 96 V.32	419
MM0250	Personal Modem 2400 Plus Ext	149
MM0810	Pocket Edition 2400	125
MM0210	Ultra SmartModem 9600 V.32	689
MM0860	Ultra 144 V.32 BIS. Ext	849
The Complete PC		
FX0060	The Complete Communicator	320
FX0040	The Complete Fax/9624	239
Zoom Telephonics		
MM0690	HC2400S w/9600 Send/Rec Int.	95
MM0660	MX2400S w/9600 Send/Rec Ext	99
MM0600	Modem v.42bis/2400 Ext	125
MM0820	V.32 Turbo 9600 Ext	349
MM0990	Zoom 9624 Send/Receive Fax	135

NETWORKING

3-Com		
NT0050	Etherlink II-Single User	199
NT0060		
NT0110	Lanlastic 2 MBPS Adapter Card	149

INPUT DEVICES

Apollon		
IN2130	MousePen Professional	65
IN2160	Thumbina	69
Care		
IN2314	*The Typist Plus Graphics (AT)	389
CG Products		
IN0910	FlightStick with Falcon 2.0	45
Logitech		
IN1070	Scanman 256	269
IN2250	Trackman Portable	99
Marstek		
IN2310	*Color Artist Hand Scan. for Win 3.0	489
IN1040	M-800 Scanner w/OCR	169
IN2000	*M-800W Scanner w/Image-In	165
IN2070	M-6000GG ColorArtist w/OCR	399
Microsoft		
IN2190	Ballpoint Mouse	119
IN0690/80	Mouse (bus/ser)	85
IN0275/84	*Mouse w/Windows (bus/ser)	145
MicroTouch Systems		
IN0810	The UniMouse	165
The Complete PC		
IN2110	Complete Page Scanner w/WordScan OCR Software	569
Z-NIX		
IN1003/5	*SuperMouse II (ser) w/Win 3.0	89

MONITORS

Various		
MT0280	PanaSync CI381 14" VGA Color	369
MT0320	Samtron Super VGA Color	329

ENTERTAINMENT & EDUCATION

Abracadabra		
EN2694	Design Your Own Home Architecture, Interiors, Landscape	49 ea
EN2684	Design Your Own Railroad	35
Broderbund		
EN0734	SimCity	29
ED0184	Where in the USA is Carmen San Diego	32
Centron		
EN1073/5	Casino Master	39
Entertainment On Line		
EN2014	Lottery Tracker & Wheeler 4.0	29
Microsoft		
EN1473/5	*Entertainment Pack	29
EN0043/5	*Flight Simulator 4.0	38
Personal Training Systems		
ED2323	*Excel 4.0 beginning Spreadsheets	65
ED0323	*Word 2.0 beginning	65
ED0310	*WordPerfect 5.1 beginning	65

DESKTOP PUBLISHING & GRAPHICS

Adobe		
	Adobe Fonts (various)	Call
PR1594	*Adobe Type Manager	59
GR2094	*TypeAlign	65
GR5144	*Illustrator 4.0 for Windows	449
Aldus		
GR3043/5	*Aldus FreeHand	399
GR5034	*Aldus PhotoStyler	549
GR2053/5	*PageMaker 4.0	489
GR5013/5	*Persuasion 2.1	330

Aras Software		
GR3074	*FontMonger for Windows	98
Atach		
GR2783/5	*Publisher's Powerpak for Windows	44
GR2773/5	*Publisher's Powerpak for WordPerfect	44
Berkeley Systems		
GR1564	*After Dark 2.0 for Windows	29
Broderbund		
GR1564	New PrintShop	35
Computer Associates		
GP1823	CA Cricket Graph 1.3	85
Corel Systems		
GR0435	*CorelDRAW! 2.0	369
FontBank		
GR2783	FontBank Type Companion	99
Micrografx		
GR2783/5	*Micrografx Designer 3.1	485
GR2833/5	*Windows Draw!	105
Microlog		
GR1444	MoreFonts 3.0	79
Microsoft		
BS2304	*Powerpoint for Windows	315
GR3144	*Microsoft Publisher for Windows	129
New Vision Technology		
GR3174	*Presentation Task Force CGM 4.0	134
Orcon		
GR2183/5	*Perceive Personal 2.0 for DOS & Windows	119
Software Publishing		
GR2303/5	Harvard Graphics 3.0	415
GR5083/5	*Harvard Graphics for Windows	389
ZSoft		
GR0634	PC Paintbrush IV Plus	119

CAD PRODUCTS

American Small Business Co.		
CA0023/5	Design CAD 3D 3.1	198
CA0023	Design CAD 2D	175
AutoDesk		
CA0173/5	Autosketch 3.0	146
Generic Software		
CA0074	Generic CADD 5.0	285

BUSINESS

AddStar		
UT2194	SuperStar	85
Alpha Software		
BS2164	Alpha FOUR Version 2.0	309
Approach Software		
BS6193/5	*Approach for Windows	199
Arworx		
BS5004	Graftek 2.0	129
Ashton Tate		
BS0147	dBASE IV 1.1	489
Autmap, Inc.		
BS5224	AutoMap	50
Borland International		
BS0214	Paradox 3.5	519
BS3044	Quattro Pro 3.0	319
Campbell Services, Inc.		
BS3584	*OnTime for Windows	75
Central Point Software		
UT2064	Central Point Anti-Virus	85
UT2133/5	*PC Tools 7.1	119
Computer Associates		
BS5543	*dBase	349
BS6573/5	*ACCPAC Simply Accounting for Windows	129
Darinna Tech.		
UT1704	*WinStealth Professional 2.0	105
Datastorm Tech.		
CM0424	PROCOMM PLUS 2.01	65
DataViz		
NT3620	MacLink Plus/PC	139
DCA/Crosstalk Communication		
CM0194	*Crosstalk for Windows	129
CM0284	Crosstalk Communicator	45
CM0034	Crosstalk Mkt 2.0	150
Delrina Technology		
BS2604	*PerFORM PRO 3.0	185
FK0154	*WinFax Pro 2.0	75
BS0853/5	PerFORM Pro Designer & Filler 2.1	90
Fifth Generation		
UT0724	Direct Access 5.1	65
UT2184	Fastback Plus 3.0	125
Fox Software		
BS0705	Foxbase + Dev. System 2.10	189
BS4065	FoxPro 2.0	485
Gibson Research		
UT0874	Sprint II 2.0	65
Insel Systems		
UT1614	HiJaak 2.1	99
Intuit		
FN0164	Quicken 5.0	43

FN0564	*Quicken for Windows	35
Lotus		
SI0153/5	All Lotus Upgrades	Call
	*Lotus 1-2-3 & Ami Pro 2.0	
	Double-Up Upgrade	199
BS4204	Ami Pro 2.0	299
BS5203/5	Lotus 1-2-3 1 Plus	419
BS4073/5	Lotus 1-2-3 Rel. 2.3	339
BS5253/5	*Lotus 1-2-3 for Windows	399
BS3973	Lotus Graph Writer II	335
Microcom		
CM0574	*Carbon Copy for Windows	119
CM0084	Carbon Copy Plus 6.0	115
Microsoft		
OP0113/5	DOS 5.0 Upgrade	59
BS3254	*Excel for Windows 3.0	309
FN0464	*Microsoft Money for Windows	45
BS4103/5	*Office for Windows	485
BS2733/5	*Productivity Pack	39
BS2704	*Project for Windows 1.0	445
BS2253/5	*Windows 3.0	99
BS1954	*Windows Developer's Tool Kit	315
WP0043/5	Word 5.5	209
WP0374	*Word for Windows 2.0	299
BS5324	*Microsoft Works for Windows	129
BS0173/5	Works 2.0	95
Multisoft Corporation		
UT0554	PC Kwik Power Pak 2.1	75
UT0543/5	Super PC - Kwik 4.1	45
Norton-Lambert		
CM0403/5	*Close-Up 4.0 i/Windows & DOS	119
Onna Corporation		
BS3124	*The DeskTop Set 3.0	79
PC Globe, Inc.		
BS1834	PC Globe 4.0	37
BS1844	PC USA 2.0	35
Peachtree Software		
FN0233/5	Peachtree Complete III 5.0	145
Polaris		
BS2894	*PackRat 4.0	259
Power Up Software		
BS1654	Calendar Creator Plus 4.0	49
Qualitas		
UT0584	366MAX 6	61
Quarterdeck Office System		
BS1043/5	DeSoview 386 2.4	129
EX1103/5	DEMM 386 6.0	61
Reference Software		
WP0514	*Grammatik Windows	55
Software Directions		
UT1914	Print Q 5.0	85
Spinnaker Software		
BS1923/5	BetterWorking Eight In-One	125
BS3604	*PFS Window Works	32
Symantec		
UT2273/5	Norton AntiVirus 2.0	85
UT2183/5	*Norton Desktop for Windows	99
UT2131/5	Norton Utilities Advanced 6.01	115
UT2153	*Norton Backup Windows/DOS	85
CM0173/5	PC Anywhere 4.5 Host and Remote	119
BS4013/5	Q&A 4.0	255
BS3723/5	*On Target 1.0	255
Teleware		
FN0414	*MY O B for Windows	135
Timeslips		
BS5963/5	*TimeSheet Professional for Windows	145
BS0133/5	Timeslips III 4.0	189
Tool Technology Publishing		
UT2253	*iTools	125
Traveling Software		
UT2074	Lapl. nk Pro 4.0	109
Triton		
CM0543/5	C/Session	99
WordPerfect Corp.		
WP0363/5	WordPerfect 5.1	299
WP1533/5	*WordPerfect 5.1 for Windows	275
WordStar U.S.A.		
WP1604	*Correct Grammar for Windows	65
WP1614	*WordStar for Windows	279
XTree Company		
UT1874	XTree Gold 2.5	99

LANGUAGES

Borland International		
LN1654	Borland C++ 3.0 Pro!	329
LN0484	*C++ for Windows	319
LN1664	*Object Vision for Windows	105
LN1673	Turbo C++ 2nd Edition 1.0	69
LN0463/5	*Turbo C++ for Windows	105
Microsoft		
LN0085	QuickBasic 4.5	65
LN1674	Visual Basic	129

Approach for Windows

For designing a database, searching or creating information and generating reports, this powerful approach to Windows Windows. Approach for Windows is a comprehensive database, search, and report tool for Windows. It includes a powerful database design

OVERNIGHT DELIVERY
ONLY \$7.00
1-800-367-7080

**Micro
WAREHOUSE**

All our products are powered by a 3.20 megabyte hard disk. Delivery and installation service available. Hardware and software sold separately. All prices are suggested retail prices.



**★Presentation Task Force
CGM clip art 4.0**

Now you can own the clip art PC Magazine recently called... "The best CGM clip art package for overall quality and usability." Presentation Task Force 4.0 is the only clip art product to feature over 3,500 high quality, color illustrations in one value packed, comprehensive volume! Use PTF clip art to enhance presentations, newsletters, and spreadsheets created with over 60 leading DOS and Windows applications, including: CorelDraw, Designer, Harvard Graphics, Microsoft Publisher, PageMaker, Persuasion, PowerPoint, Quattro Pro, Ventura Publisher, Word for Windows, WordPerfect, and many more! PTF 4.0 contains people, animals, business symbols, medical illustrations, holidays, sports, military, and environment-related images. Publisher: New Vision Technologies, Inc. GR3174

\$134

Graftek 2.0

Graftek analyzes and graphs your data, performs calculus, carries out complex statistical calculations, Frequency analysis (FFT), transformations and curve fits. It includes an extensive library of math and trig functions, allows you to define and plot your own functions. Graftek's Calculus Menu computes area under the curve, zeros, maxima and minima, inflections, intersections and more. The Statistics Menu computes descriptive statistics, histogram, normal distribution, box-plot, pie chart, scatter plot, trend analysis and more.

Publisher: Artworx BS9004

\$129

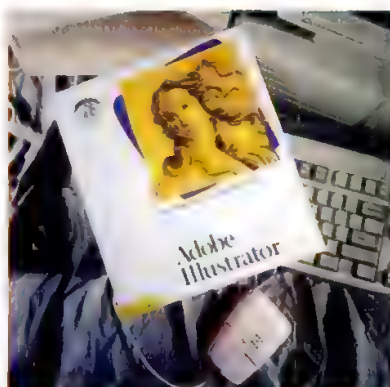


**Design Your Own Home:
Architecture, Interiors,
Landscape**

With Architecture, you can draw professional-quality floor plans, side-view building plans and structural details in record time, determining home improvement costs. Architecture automatically calculates all distances, areas, and angles. Interiors is a beautifully simple approach to a more beautiful home. Arrange and rearrange furnishings in seconds. Explore public color schemes and variations. Switch from top views to side views. Landscape is easy to use and can help prevent costly mistakes. Position flowers, shrubs, trees, walks, steps, fences, etc. for that look you want. Dozens of sample plans are included with each version. Modify them or create your own. Publisher: Microcadem Architecture INC604

Publisher:
INC604
Landscape
INC714

\$49^{ea}



★Adobe Illustrator 4.0

Adobe Illustrator 4.0 for Windows provides a professional illustration solution for the PC environment. This new version of the program allows graphic artists, designers and desktop publishers to create professional-quality illustration and design. This value-packed program includes Adobe Type Manager software (ATM), 40 Adobe Type 1 type faces, the Adobe TypeAlign type manipulation program, Adobe Separator color separation software and a generous selection of Adobe patterns, textures symbols, and borders. Other features include: Edit in preview, On-screen text, Resizable toolbars plus enter and edit text directly on screen. With Adobe Illustrator, users can now freely exchange files between Windows, Macintosh and x86 desktop platforms. Publisher: Adobe Systems GR5144

\$449

MacLinkPlus/PC

MacLinkPlus/PC is the industry standard, providing a complete kit of utilities for transferring and translating files between your Mac and a PC. AT, XT, PS-2 Laptop or any compatible running under DOS or Windows. It contains MacLinkPlus Translators, an extensive library of file translators, DOS Mounter software for exchanging DOS disks between Macs and PCs, along with Mac and PC communications software to transfer files using the provided serial cable or your modem. Over 400 word processing, spreadsheet, database and graphic conversion paths provide translation from one software format to another. With MacLinkPlus/PC, your computers are more compatible than ever - making you more productive than ever. Publisher: DataViz NT3620

\$139



dBFast for Windows

dBFast provides a migration path to Windows for dBASE, Clipper and Foxbase applications. With extensive Windows support applications you can utilize Windows objects such as push buttons and check boxes. Publisher: Computer Associates BS5543 \$149.

ACCPAC Simply Accounting for Windows

Ready to computerize your accounting? ACCPAC Simply Accounting contains everything you need to get up and running in a flash. Features: a primer that walks you through basic accounting principles, a real-life tutorial with sample data, and six different, modifiable industry accounts charts. Publisher: Computer Associates FN05245 \$129

CA-Cricket Graph 1.3

CA-Cricket Graph is the charting application for scientists, engineers, and business people. It's ideal for anyone who needs to create graphs for reports, presentations, and data analysis. Publisher: Computer Associates GR1823

\$85

PrintQ 5.0

Using Windows? Request more copies without restarting your application! Print special forms such as letterhead more easily! Print from your DOS programs running under Windows! Keep on printing after you exit Windows, Wordperfect or Lotus. Using PrintQ 5.0 with Windows, you have much more than just a faster Print Manager, you have an unparalleled level of output management. Notebook users, print without a printer. "The Rolls-Royce of Print Spoolers" (PC World). Publisher: Software Directions TT1914

\$85



Turn your excess inventory into a substantial tax break and help send needy kids to college as well.

Call for your **free guide** to learn how donating your slow moving inventory can mean a generous **tax write off** for your company.

Call (708) 690-0010

Peter Roskam
Executive Director



P.O. Box 3021, Glen Ellyn, IL 60138
FAX (708) 690-0565

Excess inventory today...student opportunity tomorrow

CONNECTIVITY PC-TO-MAC CONNECTIONS

Before Mac users can use network files, the system administrator must create one or more Macintosh volumes (known as shared directories to *LAN Manager*) on the network. *LAN Manager for Mac* allows you to publish the same volume for both Mac and PC users; the volume may appear under different names to each type of user. For example, the directory C:\MAILLIST can appear as MAILLIST to PC users, and as Mailing List to Mac users.

If you are installing a new network that will include Macs and PCs, *LAN Manager Services for Macintosh* deserves serious consideration.

NetWare for Macintosh

Novell is an old pro at Macintosh interoperability. The company has been selling a Macintosh add-on product for more than three years, and the newest *NetWare for Macintosh*, Version 3.01, offers excellent diagnostics, an administration program that can be run from the Mac, improved printer features, and quick operation. On the minus side, it lacks extension mapping and supports only one type of LocalTalk adapter.



NetWare for Macintosh, Version 3.01
Novell Inc., 122 E. 1700 South, Provo, UT 84606; 800-638-9273, 801-429-7000.
List Price: 20 users, \$895; 100 users, \$1,995; 200 users, \$2,995.
Requires: Server: 5MB RAM for 100 users; *NetWare*, Version 3.11 or later. Macintosh workstation: System 6.0 or later; *AppleShare Workstation*, Version 2.0 or later.
In Short: A capable and efficient *NetWare* Loadable Module program for *NetWare* 3.11, *NetWare for Macintosh* installs easily and includes administrative tools that run on the Macintosh. But it inconveniently lacks an extension-mapping facility.

CIRCLE 463 ON READER SERVICE CARD

Now you can add the perfect photo to everything you produce!

Nothing communicates, nothing *captivates* like a real-life photo. And now, **Picture Publisher® 3.0** for Windows lets you retouch photos and add them to everything you produce – including newsletters, presentations, reports, brochures and more!

Scan them in.



Step 1: Import photos into your PC from scanners and other sources.

You start by importing photos into your PC. You can use almost any scanner: color or black-and-white, desktop or hand-held. You can also import images into **Picture Publisher** from electronic files, digital cameras, CD-ROMs or video frame grabbers. And don't worry about the quality of the photos you import. You'll be able to retouch and enhance them yourself!



FREE Color Scanner!

Act now and get the industry's leading hand-held color scanner – the **Mustek M-6000CG Color Artist™** – free with your purchase of **Picture Publisher!** Call for details.



With powerful features like these, it's no wonder **Picture Publisher** has won *Publish* magazine's Reader's Choice Award three years running, and been selected *Compute's* 1991 Editor's Choice.

Crank them out.



Step 3: Add your photos to newsletters, presentations, reports and more!

You'll be able to export your images to popular desktop publishing, word processing and presentation packages. Including **PageMaker**, **Micrografx Designer**, **Word for Windows** and dozens more. You can output them to a wide variety of Windows printers. Or use them to make black-and-white or color separations, slides and pre-press materials.

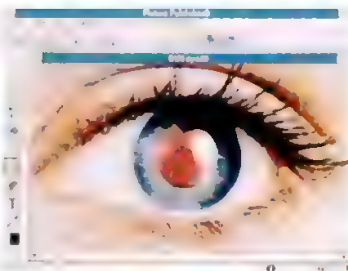
Call for a free booklet!

Say the word and we'll rush you a copy of our exciting, full-color guided tour of **Picture Publisher**. We'll also tell you where you can get the free scanner with your purchase. Call today!

Current users: Call for your special upgrade price!

1-800-998-0147

Touch them up.



Step 2: Retouch and enhance your photos with an array of easy-to-use tools.

Once the images are in your PC, you can put **Picture Publisher's** easy-to-use retouching and enhancing capabilities to work. You'll be able to adjust colors and sharpen or blur edges. You can colorize black-and-white images, or combine multiple images to create a montage. You can add ready-made backgrounds, or create your own (is that you in front of a Russian tank?). And you'll enjoy experimenting with filters, masks and special effects.

M I C R O G R A F X®

Micrografx, Inc. 1303 Arapaho, Richardson, TX 75081 (214) 234-1769. Micrografx has offices in Toronto, Paris, London, Munich, Milan, Sydney, Madrid, Copenhagen and Tokyo. Copyright © 1992, Micrografx, Inc. All rights reserved. Micrografx and Picture Publisher are registered trademarks and Micrografx Designer is a trademark of Micrografx, Inc. All other products are trademarks or registered trademarks of their respective owners.

CIRCLE 361 ON READER SERVICE CARD

Novell's original Mac offering was *NetWare for Macintosh*, Version 1.0, which installed as a value-added process (VAP) on a *NetWare* 2.15 server. The latest release, Version 3.01, runs as a *NetWare* Loadable Module (NLM) with Novell's present top-of-the-line *NetWare* 3.11. Version 2.15 of *NetWare for Macintosh* ran slowly. Novell also provides *NetWare for Macintosh* with *NetWare* 2.2 servers; it comes inside the basic *NetWare* 2.2 package. If your organization has opted for the more powerful *NetWare* 3.11, you have to pay an additional \$895 to connect 20 Macs to your LAN.

During extensive testing, we found *NetWare for Macintosh* to be a capable performer. In some cases, our Ethernet-equipped Macs could retrieve files from the LAN faster than they could from their local hard disks.

In fact, *NetWare for Macintosh*'s only shortcoming is its lack of an extension-mapping facility. Both of the other products we tested for this story automatically assign a Macintosh file type and creator to PC files; *NetWare* does not. If you want a PC file to have the proper Mac file type and creator, you have to edit the file's type and creator information with Apple's

ResEdit or a similar utility.

Mac users can access any files and printers on the server by using the Macintosh Chooser, just as they would with an AppleShare server. Like all *NetWare* users, they must have rights to a file or folder before they can access it.

Under DOS and OS/2, *NetWare* clients must log on before they can use network printers. Mac users, on the other hand, can access network printers without logging on to the network, though you can require them to log on if you like. The earlier version (3.0) of *NetWare for Macintosh* did not allow Mac users to access non-AppleTalk printers. The latest release lets users access any PostScript printers, including printers attached to client PCs.

Novell supplies two accessory programs with *NetWare for Macintosh*, but you will not really need them for day-to-day use. The *NetWare* Desk Accessory lets Mac users monitor and control printer queues, send messages via the *NetWare*

message facility, and view and set file rights. The *NetWare* Control Center (NCC) allows a network supervisor to create, delete, and manage user accounts and groups.

Like the other two products, *NetWare for Macintosh* installs on the file server. Installation is quick and easy, taking about 10 minutes.

Once you have completed the soft-

ware installation, you have to edit the AUTOEXEC.NCF network configuration file manually to add configuration data for the Mac services. This process can be tricky, especially on complicated, multizone networks. Fortunately, Novell provides an excellent tutorial on the intricacies of AppleTalk network management.

*NetWare for
Macintosh's only
shortcoming is its lack
of an extension-
mapping facility to
assign a Mac file type
and creator to PC
files.*

CONVERTING FILES BETWEEN PCs AND MACS

PC application	How to convert	Mac application
Aldus Persuasion	Save in Version 2.1's Interchange format	Aldus Persuasion
AutoCAD	Save in native format	AutoCAD
dBASE	Save in native format	dBASE IV RunTime Plus
Freelance Graphics	Save as CGM file and use MacLink Plus/PC to convert to Pict file, or transfer Windows metafile	Aldus Persuasion
Harvard Graphics	Save as EPS file	Adobe Illustrator
Lotus 1-2-3	Save in native format	Lotus 1-2-3 for Macintosh
Microsoft Excel	Save in native format	Microsoft Excel
Microsoft PowerPoint for Windows	Use PowerPoint's optional translation utility	Microsoft PowerPoint for Macintosh
Microsoft Word	Save in native format	Microsoft Word
Microsoft Works	Save as .WKS file for spreadsheet, as .RTF file for word processing; use MacLinkPlus/PC for database files	Microsoft Works
PageMaker	Save in native format	PageMaker
Quattro Pro	Save as .WK1 file	Lotus 1-2-3 for Macintosh
WordPerfect	Save file in DOS WordPerfect format	WordPerfect for Macintosh
WordStar	Use Star Exchange (included with WordStar) to save file in MacWrite format; use MacLinkPlus/PC to save file in WordStar format	MacWrite

SCANT BOARD SUPPORT

We were surprised to find that our two-year-old Novell-made NL-1000 LocalTalk board was not on the list of supported LocalTalk boards for *NetWare* 3.11. Novell advised us that the only supported LocalTalk board at the moment is Dayna Communications' DL-2000. Dayna offers a card upgrade for a discount of 50 percent off the list price.

NetWare for Macintosh includes an excellent AppleTalk diagnostic tool called the AppleTalk Console, or ATCON.NLM. You can use ATCON along with another utility called ECHO to identify and test connections on your AppleTalk network. We found ATCON to be a helpful tool, especially on our complicated, multi-server test network. It displays the network name and address of every AppleTalk device on the network, including servers, clients, and printers.

If your organization already has *NetWare* and needs to connect Macs to the network, *NetWare for Macintosh* provides everything you need.

The World Standard

First Edition

★★★★★

Everything you've been missing

HIDDEN PLOTS DISCOVERED

Desktop Mapping Held Responsible

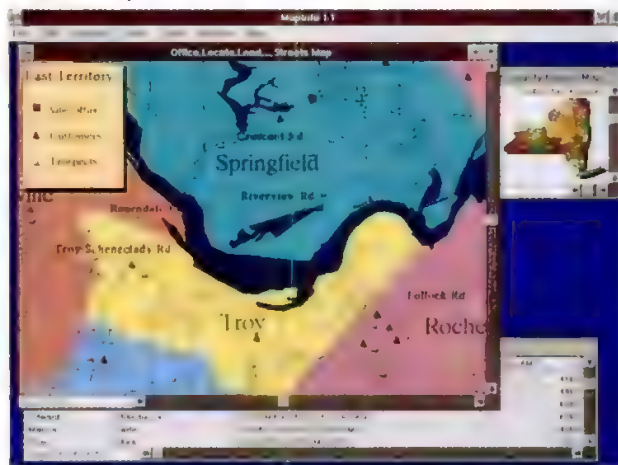
For years organizations have had to rely on spreadsheets and other data analysis techniques to interpret information. But apparently, they've been missing a lot. The new technology of desktop mapping is revealing just how much.

As spokesmen at MapInfo,® the leader in desktop mapping, put it: "By advancing relational database technology to incorporate data with maps, MapInfo has produced a breakthrough in analysis capabilities. It is literally 'showing' its users patterns, relationships and trends that they never knew existed.

"In the process, it's allowing them to understand and present information more quickly, clearly and thoroughly. It's helping them deploy their resources more realistically and profitably. It's showing

them how to target customers, service territories and optimize sales. It's helping them plan land use, select site locations, and efficiently manage facilities and operations.

"In a word, it's allowing them to visualize and take advantage of options and opportunities that other data analysis techniques simply can't show."



With MapInfo, you can overlay data from dBASE (DBF), Lotus 1-2-3, Excel, delimited ASCII, plus many other formats, and relate it to thousands of maps, down to street level on Windows, DOS, Macintosh, Sun and HP.

Free Demo Disk Tells Inside Story

It's called *Desktop Mapping The MapInfo Way*. Our reviewers call it the premier guide to discovering what's hidden inside your data.



Call 800-358-7676 x200, or Fax 518-274-0510 for your copy. Then stay tuned for more good news from The Standard On The Streets.

MapInfo

The Standard On The Streets

READ ALL ABOUT IT EVEN BEFORE IT'S IN PRINT.

This industry moves fast. If you want to be informed about it just as fast, use ZiffNet. The on-line information service about computing. You'll find the top 30 stories from *PC Week* and *MacWEEK*, plus the complete text of Spencer Katt and Mac the Knife. Every Friday night before they're published. Along with NewsBytes, the daily global industry news service. To get more information about how to sign up, simply call ZiffNet at 1-800-666-0330. Because when you're on-line, you're up-to-date.

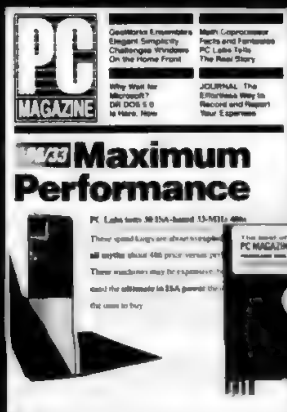


ALL ABOUT COMPUTING...ON-LINE

CompuServe and ZiffNet members type GO ZNT:INDUSTRY ©1992 Ziff Communications.

CIRCLE 069 ON READER SERVICE CARD

GET NONSTOP SYSTEMS INFORMATION —AND 2 DISKS FREE!



PC MAGAZINE is the one publication you can trust to keep you up-to-date on the latest developments in the ever-changing world of computing.

Subscribe now to make sure you don't miss a single product report or productivity-enhancing tip.

■ One year (22 issues) for \$29.97.
SAVE 54%.

■ Two years (44 issues) for \$49.97.
SAVE 62%.

And if you order now, you'll also get our exclusive 2-DISK "BEST OF PC MAGAZINE'S UTILITIES"—FREE with your paid subscription!

Don't delay. Call toll-free today to claim your savings and FREE "BEST OF PC MAGAZINE'S UTILITIES!"

1-800-289-0429

Please add \$32 per year for postage outside the U.S., U.S. currency only. Canadian GST included. Please allow 30 days for delivery. Disks will be shipped upon payment.

CONNECTIVITY

PC-TO-MAC CONNECTIONS

VINES Option for Macintosh

Banyan Systems made its PC-to-Mac connection just in time. As the deadline for this review approached, Banyan was preparing to release Version 5.0 of its Unix-based *VINES* networking software, the first *VINES* release to support Macintosh clients. The product we reviewed was a final beta-test release. Priced at \$1,995, *VINES Option for Macintosh*, Version 5.0, is the most expensive of the three products we tested. *VINES* itself costs another \$7,495 for the unlimited-



VINES Option for Macintosh, Version 5.0

Banyan Systems Inc., 120 Flanders Rd., Westboro, MA 01581; 800-222-6926, 508-898-1000.

List Price: Unlimited users, \$1,995.

Requires: Server: 5MB RAM; *VINES*, Version 5.0. Macintosh workstation: System 7; AppleShare Workstation, Version 2.0 or later.

In Short: Although expensive for small networks, *VINES Option for Macintosh* is ideal for multiple-platform, multiple-site networks. *VINES for Macintosh* uses extension mapping to connect Macintoshes to *VINES* networks. An optional program lets Macintosh users access *VINES* e-mail services. *VINES for Macintosh* has some administration capabilities, but you must do most management from a DOS client.

CIRCLE 461 ON READER SERVICE CARD

user version. *VINES Option for Macintosh* includes an easy-to-use extension-mapping feature and some administration features you can set from the Mac. *VINES* performed capably, but Novell and Microsoft's products offer a better value for local area networks.

Unlike *NetWare* and *LAN Manager*, *VINES* was conceived from the start as a multiple-platform, multiple-site network. *VINES* provides advanced routing facilities that you can use to create a WAN, a wide area network of *VINES* LANs. Previous releases of *VINES* included support

for DOS and Unix clients; Version 5.0 adds support for OS/2 and Macintosh clients as well.

VINES Option for Macintosh includes an extension-mapping facility. Like the extension-mapping feature in *LAN Manager Services for Macintosh*, *VINES Option for Macintosh* automatically adds the proper Macintosh type and creator information to files created on PC clients. *VINES Option for Macintosh* includes a few sample extension mappings for popular DOS programs, and adding more is easy. But unlike *LAN Manager Services for Macintosh*, there are limits on the number of mappings allowed with *VINES Option for Macintosh*. If you limit Mac filenames to 8 characters or fewer, you can create up to 44 mappings. If you wish to use 31-character Mac filenames, you can have 21 mappings active at once.

Mac users attach to a *VINES* server by using *AppleShare Workstation*. Like the other products we tested, *VINES* servers and shared printers appear in the Mac's Chooser. After selecting a server and entering a user name and password, the user selects a network volume from a list of available volumes.

A NETWORK OF CANS

Unlike most LAN software, *VINES* makes a distinction between attaching to a server and connecting to the network. From the *VINES* point of view, a local server is just that: a file server available on your LAN. The network in *VINES* terminology is a network of LANs.

A large *VINES* network may include telephone, microwave, or satellite links among several physical locations. Once you connect a particular LAN to the network through a Banyan-supplied Chooser extension, you can use any Mac-compatible shared resources anywhere on the network.

PC and Mac users can share any PostScript printer with *VINES*. The *VINES* printer queues show up on the network as ATPS servers, as in the *LAN Manager Services for Macintosh* and *NetWare for Macintosh* servers.

VINES Option for Macintosh includes a utility program that allows Macintosh users to view and set file rights. This allows some degree of administration from a Mac client, but you must per-

form user and resource management from a DOS client.

VINES Option for Macintosh also includes a network message facility that lets users send one-line messages to each other. If you need more extensive network messaging, Banyan offers an \$895 package, *VINES Mail for Macintosh*, that lets Macintosh users access *VINES* network mail services.

Installing *VINES Option for Macintosh* is straightforward and takes about 10 minutes. *VINES* supports a wide variety of network adapter boards, allowing Mac users to connect via LocalTalk, Ethernet, or Token-Ring cable.

VINES provides a complete networking product for organizations with a mix of platforms or a geographically scattered user base. At \$7,495 plus another \$1,995 for Macintosh support, *VINES* is an expensive solution. If you need the features of a wide area network, you will find *VINES Option for Macintosh* a capable performer that offers considerable value. But for single-site networks, *LAN Manager Services for Macintosh* and *NetWare for Macintosh* offer more bang for the buck. ■



Attention Power Users!

For a more powerful Unix system, schedule regular workouts with RecoverEase™ data recovery and protection software - the most powerful set of utilities equipped to condition in the Unix arena. With RecoverEase, you can run a marathon of functions in record breaking time - from rebuilding corrupt files to recovering them from a downed system!



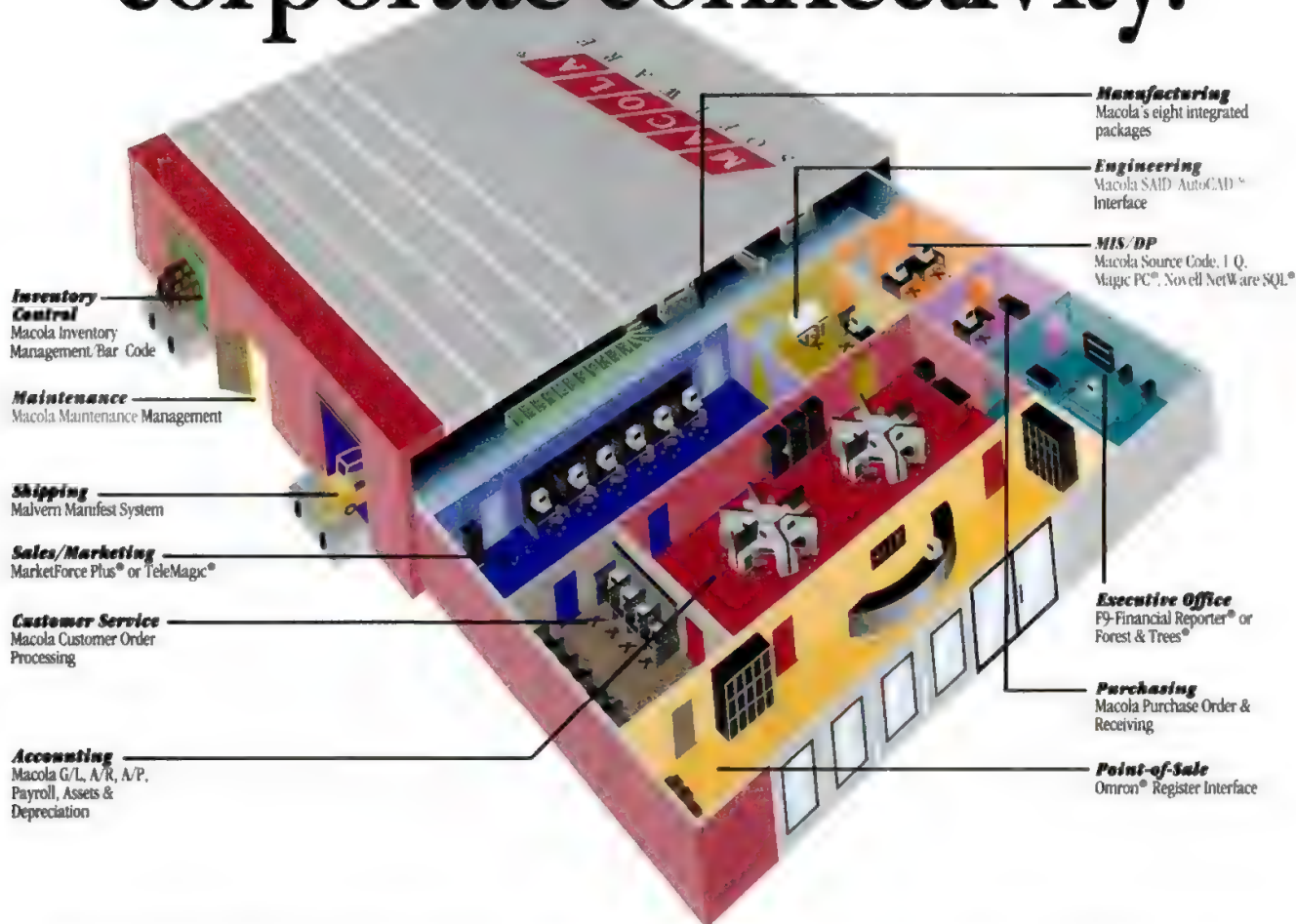
**Data recovery software
with muscle.**

Ontrack
COMPUTER SYSTEMS

1-800-752-1333

International 612-937-1107 • Fax 612-937-5815 • 6321 Bury Drive, Eden Prairie, MN 55346

Accounting Software that powers corporate connectivity.



Link and integrate your PCs and people in all these departments. You now have the ability to *seamlessly connect your departments* for shared operations, reporting and analysis. Macola Accounting Software bridges the communication gap between the highly respected PC software products shown above.

One software to drive your company's teamwork. The engine for this enterprising solution is Macola Accounting Software. Macola processes the Btrieve information flow from all departments so you can get the right information to the right person at the right time to make the right decision. And act *before* your customers ask—or your competition can react.

Build your business around a proven performer. With Macola, you can be sure that your software investment will constantly remain at the forefront of business management technology.



Here's proof. *Only* Macola has won PC Magazine's prestigious Editors' Choice award for high-end accounting software an unprecedented *three times in a row*.

What does this mean to you? Software that's flexible and easy-to-use. LAN performance with no limitations. The most customization options to best fit your company. Local support. In short, powerful software that exceeds your current financial and information management requirements.

So link your company's PCs with the common goal of increased productivity. Call us today for all the details.

1-800-468-0834

MACOLA
SOFTWARE

333 East Center Street Marion, Ohio 43302-4148

CIRCLE 263 ON READER SERVICE CARD

**Accounting Software
You'll Never Outgrow**



PC Magazine is a publication of Ziff Communications. All products carry registered trademarks of their respective manufacturers. Macola is a registered trademark of Macola, Inc. Copyright 1992



Low-Cost Accounting Software

Big Gains for Small Business

by Raymond A. August and Ted Stevenson

They're inexpensive and powerful, but often they're not pretty. Here, we look at accounting packages priced under \$300 that can help small businesses flourish—some with less pain than others.

Beneath the current cloak of economic gloom, the good news is that small business is alive, well, and growing at a surprising rate. These *micro businesses* (most have four or fewer employees) run the gamut of business types from manufacturers and retailers to service providers and consultants. They all share a common need for accurate bookkeeping and accounting.

One critical factor that sets micro busi-

nesses apart from larger organizations is that in the vast majority of cases the person responsible for maintaining the numbers is *not* a professional bookkeeper or accountant. The job is likely to fall on the owner, the owner's spouse, an employee whose primary duties lie elsewhere, or at best a small-business accountant. The first three of these possible candidates are typically not trained in accounting or financial analysis.

The software industry has placed fairly sophisticated accounting capabilities in the hands of personal computer users—at a variety of cost levels—and this has been a boon to small businesses. However, many PC-based accounting packages, even the inexpensive ones, have evolved from complex high-end applications designed by and for professional accountants. Many of the products offer the ability to create records for thousands of accounts, plus reporting for multiple departments, even multiple companies—capacities clearly far beyond the needs of micro businesses. Many also retain the flavor, procedural complexity, and arcane vocabulary of tools designed for corporate accounting specialists. This type of product does not work well for untrained accounting users—people whose energies are taken up keeping a business growing and prospering.

The traditional software trade-off is power for ease of use, and accounting is no different. Small businesses don't need the accounting sophistication required by multidepartmental companies with professional managers and bean counters. What they do need are financial tools that are easy to set up, easy to use, easy to understand, and somewhat fail-safe.

MORE FRUGAL ACCOUNTING

In our last accounting roundup, we reviewed the high end of the PC accounting market, which includes packages that meet the needs of companies employing professional accountants—packages priced in the \$1,000-per-module range. This time, we examine low-end packages that retail for \$300 or less and comprise at least three basic accounting modules—General Ledger (G/L), Accounts Payable (A/P), and Accounts Receivable (A/R)—that fulfill most businesses' record-keeping and reporting needs.

It is eloquent testimony to the ingenuity of the accounting-software industry that a number of the products reviewed here sell for a fraction of our maximum

list price, and most have far more extensive capabilities than our standard required. Unfortunately, less progress has been made in rethinking the fundamental concepts, procedures, and vocabulary of financial data. The arcane *debits* and *credits* lingo employed by packages like *Pacioli 2000* is still the rule, not the exception. The 16 packages we review here include a wide variety of interfaces and procedures. Depending on the details of your daily business, your degree of accounting savvy, and your willingness or lack thereof to deal with nongraphical environments, there is a product that's right for you.

WORKS IN PROGRESS

Bookkeeping systems are both complicated and individual, and never is the complexity more apparent than during initial setup. When you design your business's books, you'll have to face *some* complexity, but care on the vendor's part can take much of the pain out of the process.

Establishing a chart of accounts, for example, is a lot easier when you can work from a well-designed sample chart geared to the specific needs of your business, such as one of the 13 charts provided with *Teknon Accounting*.

Accounting skills, on the other hand, are more easily taught by example than by description. A good on-line tutorial, such as the ones provided by *Crystal Accounting* and *BusinessVision II*, can be invaluable in making new users comfortable with accounting procedures. Clear documentation can also help make setup (as well as day-to-day operations) less daunting when the inevitable questions arise. And for accounting software above all other software categories, prompt, accessible, knowledgeable telephone or bulletin board support frequently makes the vital difference between success and frustration. The best packages offer some or all of these aids.

Once your accounting software package is up and running, it should be easy to use. It should provide critical information such as account, vendor, and customer numbers at the touch of a key or on-line. Fortunately, many low-cost packages now do include these features. Data entry screens should help—not hamper—the data entry process.

An Accounts Payable screen that looks like a check, such as the one in *One-Write*

OUR CONTRIBUTORS

Ted Stevenson is the associate editor of *PC Magazine* responsible for software reviews.

Lance Ulanoff is a staff editor of *PC Magazine*.

Raymond A. August, CPA, is a Hackensack, New Jersey-based Price Waterhouse manager responsible for the Northeast Region Middle-Market and Growing Companies Consulting Group. He spearheads the Price Waterhouse editorial team and is a frequent contributor to *PC Magazine*.

Suzanne Colvin, CPA, is a Price Waterhouse manager based in San Jose, California, specializing in the selection of accounting software for emerging companies.

Steve Odum, CPA, based in Morristown, New Jersey, is the Price Waterhouse partner in charge of the Northeast Region Middle-Market and Growing Companies Consulting Group.

Thomas White is a partner with Systems Advisory Services, a Northern California-based consulting firm specializing in the implementation of accounting and manufacturing systems.

Additional support services were provided by Price Waterhouse representatives **Jay Hartig, CPA**, **Michael Grom, CPA**, **Terry Ferrer, CPA**, and **Liz Chernak**.

Plus Accounting Works, is far easier to work with than one like *General Business System's* cluttered screen, which requires you to enter debits and credits. *Act 1 Plus's* screen substitutes the even more obscure *1s* and *0s*. There is absolutely no reason why users should be required to think like an accountant—or a computer—when plain-English terms like “expense charged” and “amount owed” can do the job better.

USABILITY IS KEY

Well-designed accounting packages also allow you to perform tasks nonprocedurally and as necessary, rather than through a single, rigidly defined procedure. Products like *Pacioli 2000* and *Manage: Complete*, for example, never make you back out of a data entry operation in order to enter new records in master files like

What millions of people drive to work.



Why have so many people rallied behind the Microsoft® Mouse?

For some, it's the sleek award-winning design. They love the way it feels in their hand. Comfortable and responsive, providing them with total control of the Windows® graphical environment.

For others it's speed. They relish the thought of racing through their spread-

sheets, word processors and other mouse-driven applications, in record-breaking time.

But whatever it is that moves you, the Microsoft Mouse is the way to go.

For more information, call us at (800) 541-1261, Department Z19. We'll be happy to steer you in the right direction.

Microsoft®

Vendors or Customers. Simply press a hotkey and you're taken directly to the appropriate master file. When you're finished, you are returned to your data entry screen.

Besides taking information in, good accounting software makes it easy to get information out of the system in the form

of clear reports (preferably using English rather than accountingese). And the best vendors understand that, large or small, each business is unique. Therefore, their packages accommodate easy-to-define



EDITORS' CHOICE

■ M.Y.O.B.

The last time we reviewed low-end accounting packages, we did not award an Editors' Choice ("Economy Class Accounting," April 10, 1990, *PC Magazine*). Even making allowances for the variety of accounting needs, we didn't feel that any one package merited unqualified recognition for general use. The problem? The powerful packages were too hard to use, and the easy ones were short on power and flexibility.

Today, we are happy to report that as a genre, low-cost accounting software has made significant progress along the rocky road to maturity. Most of the established players have taken steps to make their software's power accessible to a broader spectrum of users, and a number of new players have arrived that challenge the established notions of what accounting software should be and should do.

Foremost among the latter is Teleware's *M.Y.O.B.*, Version 2.0, one of four new accounting packages to embrace the Microsoft Windows environment. With their shallower learning curves and easy data transfers (through Clipboard today, through DDE tomorrow), these packages tend to manifest more innovative design ideas and are generally easier to use.

M.Y.O.B. offers a good balance between usability and accounting functionality. Furthermore, it is designed around the revolutionary idea that business systems should go beyond accounting tasks and help people manage their businesses in other ways.

M.Y.O.B.'s Traceback feature, for example, which allows users to locate accounting source documents from summary General Ledger listings with the click of a mouse button, is ingenious, useful,

and elegantly implemented. The package's remarkably sophisticated To Do list is an outstanding management support tool, especially for people whose primary job is not accounting. Both features are unique to this package.

M.Y.O.B. has a wealth of predefined reports (67 in all), and its ability to create WYSIWYG statements, invoices, and checks can save small businesses the considerable cost of commercially preprinted forms. Unfortunately, those who need a Payroll module or LAN support must look elsewhere, since *M.Y.O.B.* does not have either of these features. The package also lacks an upgrade path.

Access to Platinum, Version 2.5, the most feature-rich of the Windows packages, supports multiple computing platforms and has an upgrade path, but it pays for its greater functionality by being harder to use. This reflects the traditional trade-off that some of the newcomers are trying to circumvent.

Ease of use is not limited to the Windows world, of course. *One-Write Plus Accounting Works*, the friendliest of the DOS-based packages in our roundup, has long been a market leader. The latest version, which we review here, embraces new features that, like *M.Y.O.B.*, address larger issues of business management. But again, there's a sacrifice of functionality with this package (it has no Inventory module), especially in comparison with the old guard of heavyweight DOS programs.

Three longtime top contenders in the highly competitive DOS marketplace (where the focus is on features, not ease of use)—*Act 1 Plus*, *DacEasy Accounting*, and *Peachtree Complete III*—continue

to offer great value and functionality. These programs are not for novices, though.

Manage: Complete and *PC Accountant* are DOS-world newcomers that rival the above-mentioned programs in functionality. In addition, they offer the advantages of using *FoxPro* (flexible reporting, accessible source code, and so on) and the popular .DBF file format as a standard. Both packages have niche as well as general appeal: *Manage: Complete* offers a fully integrated point-of-sale solution for retail businesses, and *PC Accountant* offers a strong solution for distributors with multiple warehouses and RMA (Return Merchandise Authorization) processing. For accounting-savvy businesses on very tight budgets, *Pacioli 2000*, Version 1.06, offers satisfactory functionality at an extremely low price.

Perhaps the greatest promise still resides in the future—the near future. Intuit's impending entry, *QuickBooks*, promises to be the easiest of all to use, and at a functionality level that may amaze you. Especially appropriate for those wishing to upgrade from *Quicken* or for small businesses automating for the first time, *QuickBooks* might have been an Editors' Choice winner had it been released in time for this review.

From what we have seen of prerelease versions, another future entry, *Peachtree Accounting for Windows*, promises to lead the new wave of Windows products with exciting features such as richer OLE and DDE capability, hypertext links with Lotus Corp.'s *SmarText*, use of an icon bar à la *Excel*, and better font and printer control.

What laptop owners use to get out of a tight spot.



With the Microsoft BallPoint Mouse, you and your laptop will always have plenty of room to maneuver.

Because BallPoint is compact and portable. You just hook it to the side of virtually any laptop, adjust the angle to 0, 30, 60 or 90 degrees, and comfortably thumb your way through the Windows graphical environment.

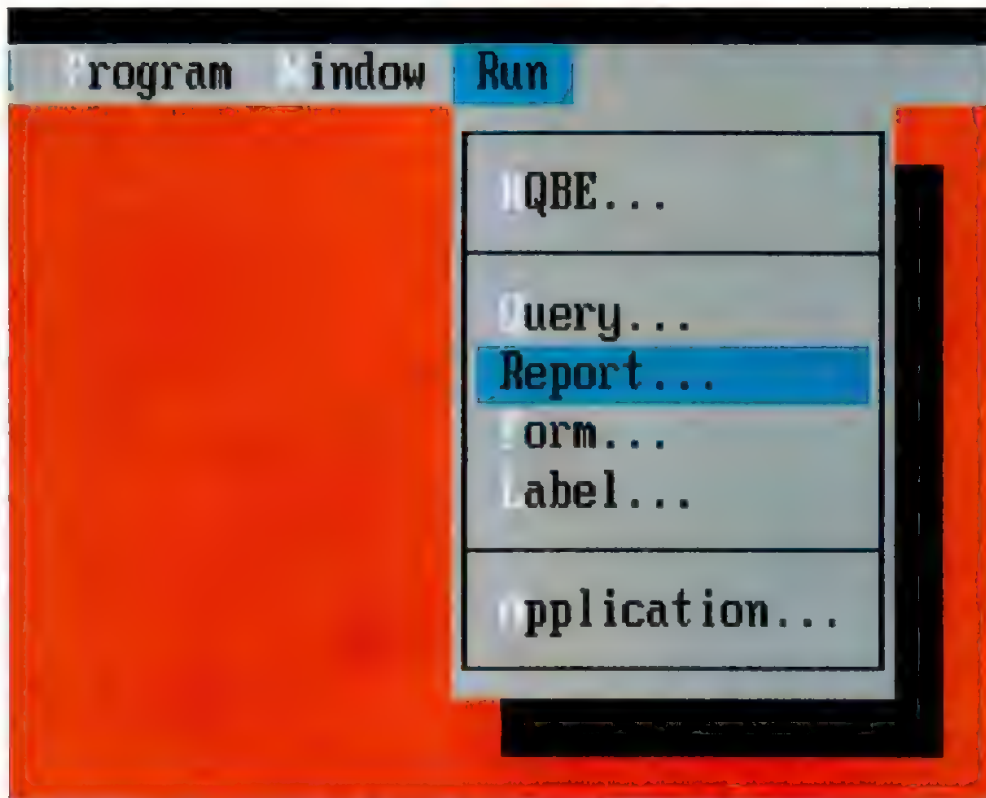
No matter where you are.

And of course, with BallPoint you still get all the features that have made our full-size mouse the industry favorite.

For more information, just give us a call at (800) 541-1261, Department Z62. We'll be more than happy to tell you all about the biggest little mouse on the market.

Microsoft

See Fox *RUN*.



We've just added a new word to the database vocabulary: *RUN*.

And it can make you a master of your database management universe. Even if you've never managed a database before.



The most powerful PC DBMS available is now the easiest to use, too: FoxPro™ 2.0.

Pick *Run* from the FoxPro 2.0 main menu and you have instant access to your information. Click on *Report*, choose the name of the report you want, and it's yours. Do the same for queries, forms, labels and applications.

For answers on-the-fly, pick *RQBE* (Relational Query By Example) and get a simple interface for creating custom queries quickly and easily. Unlike other query systems, RQBE lets you browse the information or create instant databases, reports, labels, or business graphs (with optional FoxGraph or other graphic program).

Custom systems are easy, too.

You create quick reports, forms, labels and applications by clicking on the *New* button in the dialog box instead of picking a name from the list.

Then using our simple tools, you build forms containing buttons, lists, check boxes, text regions and data fields. Reports with headers, footers and

subtotals. And even complete applications.

All without any programming.

So while it's the most powerful DBMS you can get today, it's ideal for small businesses and large. In industry or government. For invoicing and inventory control, order entry and accounting, and all your data handling needs.

FoxPro is the state-of-the-database-art.

FoxPro 2.0 is the object-oriented, event-driven DBMS programmers have been waiting for, too.

We've added over 100 new and enhanced commands. 4GL (Fourth Generation Language) tools for creating screens, reports and menus as reusable application objects. And the ability to attach entry and exit procedures to fields, forms and windows for pre- and post-processing.

We've integrated SQL SELECT, INSERT and CREATE TABLE into the language, with the ability to use RQBE for creating SELECT statements you just cut and paste into your application code.

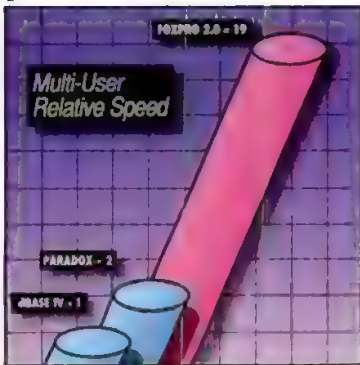
We've added a project manager on top of our debugger, trace window, and editor.

We provide an Application Program Interface (API) that links to C or assembler function libraries (Library Construction Kit optional).

And we offer an optional Distribution Kit to distribute your applications royalty-free.

Today's best choice for upgrading or downsizing critical database applications.

FoxPro is devastatingly faster than competitive products (see chart†—the difference is even greater

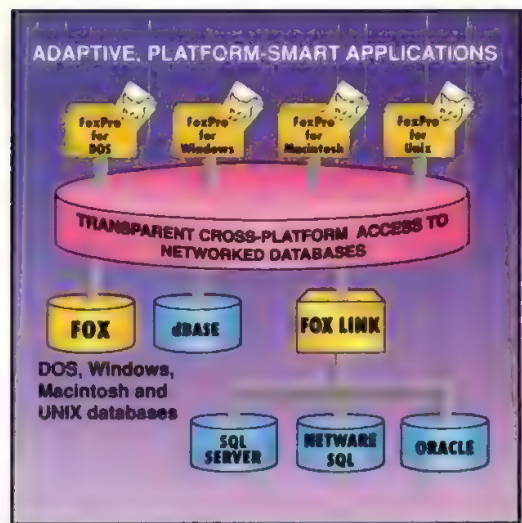


in single-user tests), and has out-queried even mainframe databases like Oracle, XBD and DB2, using our patent-pending Rushmore™ query optimization.

It's backward compatible with dBASE III+/IV and earlier versions of

Fox software to protect your investments in hardware, software, training, and support.

And in the few months since its release, FoxPro 2.0 has swept the awards. Best DOS Application - Spring COMDEX. Technical Excellence -PC Magazine. Award of Excellence -Byte. Best DBMS -Data Based Advisor. And many, many others from both editors and users of FoxPro 2.0.



Applications developed today with FoxPro for DOS, unlike other databases, will be able to run under Windows and SCO/UNIX and on the Macintosh when we release our new versions of FoxPro later this year.

Get a headstart on tomorrow today.

Today, FoxPro exchanges data with FoxBASE+ on Macs and on PCs running SCO UNIX. Later this year, FoxPro will be available for Windows, UNIX, and the Mac, with access to Netware SQL, SQL Server, and Oracle databases.

And applications written using FoxPro's 4GL tools will be platform-adaptive, so DOS or Windows applications will run on UNIX or the Macintosh, and vice-versa.

Which means you can get a headstart on your future by starting your Windows, Mac or UNIX development now with FoxPro on your current DOS PCs.

It comes with a 60-day money-back guarantee.

So pick up a copy of FoxPro 2.0 at your nearest computer or software store. Try it out for 60 days, then if you don't like it, just return it to your dealer for a full refund.

But we think you'll agree with Byte magazine in its 1/92 review of dBASE: "...FoxPro is the better product."

Call 1-800-837-FOX2 today.

(419-874-0162 from Canada)

Ask for Lit Pak PCM407



SMALL-BUSINESS FUTUREWARE: Intuit's QuickBooks

by Raymond A. August

The two most popular software packages for automating small businesses are *Lotus 1-2-3* and Intuit's *Quicken* personal check-writing program. Intuit claims that 55 percent of the 890,000 copies of *Quicken* it sold as of late 1991 have gone to small businesses. Compare this to the Software Publishers Association's statistic of a total installed base of approximately 890,000 full-fledged PC accounting packages. Why the infatuation with this \$50 check-printing package? Usability.

Intuit has now leveraged *Quicken*'s usability with several years of small-business market research and software development to produce *QuickBooks*, a new accounting package for nonaccountants. While the \$139.95 package was not shipping in time for this review, we have had a chance to work with a late beta version and found that it addresses the needs of small-business owners with admirable success. Avoiding the features overload that plagues many of its competitors, *QuickBooks* concentrates on functions that small businesses really need.

EASY DOES IT

QuickBooks offers numerous aids to get the accounting neophyte up and running easily. There are no fewer than three on-line tutorials, complete with sample data. When you're ready to set up your own company, you can choose from among 21 well-thought-out charts of accounts covering every business from graphics design to government. A QuickTrainer module offers instruction in accounting procedures.

QuickBooks' clear and simple interface, which features pop-down menus accessible from most screens, is virtually identical to *Quicken*. Also, data from *Quicken* is fully compatible with *QuickBooks*, which gives *Quicken* users a nice head start. During operation, the package communicates in unambiguous, plain-English messages such as "You have checks to print, press 7, 1." You will not see screens with names like "Accounts Receivable Transaction En-

try" in *QuickBooks*, but rather "Write/Print Invoices."

With *QuickBooks*, Intuit takes the forms metaphor used in *Quicken* one step further. The invoice entry screen, for example, looks exactly like the invoices it actually prints. And in keeping with Intuit's plain-English philosophy, the terms *owed* and *paid* replace the accountingese *debit* and *credit* on the A/P voucher entry screen.

CONSPICUOUS STRENGTHS

QuickBooks' invoicing is as strong and flexible as that of any product we tested for this review. The program provides different invoices for products, services, and professions, and these can be freely customized with text and calculated fields for things such as taxes and shipping. To help you keep up with your customers, *QuickBooks* lets you take and store notes on the fly.

Paying invoices is elegantly easy with *QuickBooks*. You can either issue checks immediately or enter vouchers to be paid on a future date. Strong project tracking is another *QuickBooks* offering. Every invoice and cash disbursement you make with *QuickBooks* can be coded with a project ID. The extensive project-related reporting includes one that lists your income statement along the left side and projects across the top for a comprehensive overview. *QuickBooks* does not, however, facilitate project billing. There is no way to add a markup or automatically produce an invoice for a project's balance.

LEDGERLESS

Accounting veterans will be interested to see that *QuickBooks* has no General Ledger per se; all adjusting entries are made as zero-balance transactions. There are also no account numbers; instead, *QuickBooks* uses verbal descriptions. Accounts can be grouped under *parent* accounts, too, in a flexible system that allows easy changes and reorganizations.

QuickBooks stores all data in a register or spreadsheet format. You can scroll through the register, pressing Enter to view specific transactions in the form in

which they were produced. If the transaction is an Accounts Payable voucher, *QuickBooks* shows you the check number and date when it was paid. If it is a customer billing, the software shows when the customer paid the bill and the amount that was paid. *QuickBooks* can be easily integrated with Intuit's \$49.95 payroll program *Quickpay*.

GREAT REPORTING

Reporting—an Intuit trademark—is superb in *QuickBooks*. Users can easily personalize standard reports by specifying parameters such as ranges to sort on and subtotal by date, amount to include, and what information to include. *Memorizing* a report format, once you've customized it, is easy. You can then rerun the report whenever you like. Intuit also recognizes that banks and other financial institutions often require accrual-basis financial statements, but the bottom line to the entrepreneur is cash flow. Therefore, *QuickBooks* will produce income statements on both a cash and an accrual basis. The package adds a useful report that indicates projected cash inflow and outflow and gives a projected balance for each day.

NOT PERFECT YET

QuickBooks' end-of-year processing could use some refinement. Currently, there are two options: to make a one-sided entry to an income summary account or to copy your current year's data files and remove all detail.

If you sell inventory products, *QuickBooks* allows you to keep a product file with an associated selling price, but that's it. *QuickBooks* has no inventory-tracking capability. If you need multiple sales prices, back-ordering capabilities, and quantity tracking, *QuickBooks* probably isn't for you.

If you run a small business and don't need to track and sell inventory in a sophisticated manner, you owe it to yourself to check out *QuickBooks*. The package offers an attractive, well-designed interface, a well-rounded feature set, and greater ease of use than any comparably powerful software. ■

TO EVERYONE
WHO HAS BEEN
WAITING FOR
PC PRICES
TO FALL,

BEST!

\$1,995

386/SX-25 NOTEBOOK

Lease: \$75/month



386SX, 25MHz Processor • 2MB RAM expandable to 16MB
• 1.44MB, 3.5" drive • 80MB IDE, 19ms hard drive • Paper
white VGA, non-glare CCFT backlit LCD • 640 x 480 resolution,
32 gray shades • Supports an external VGA • 1 parallel
port/2 serial ports • External keyboard port • MS-DOS® 5
• Leather carrying case • 8.66" x 11" x 2.08", 6.5 lb.

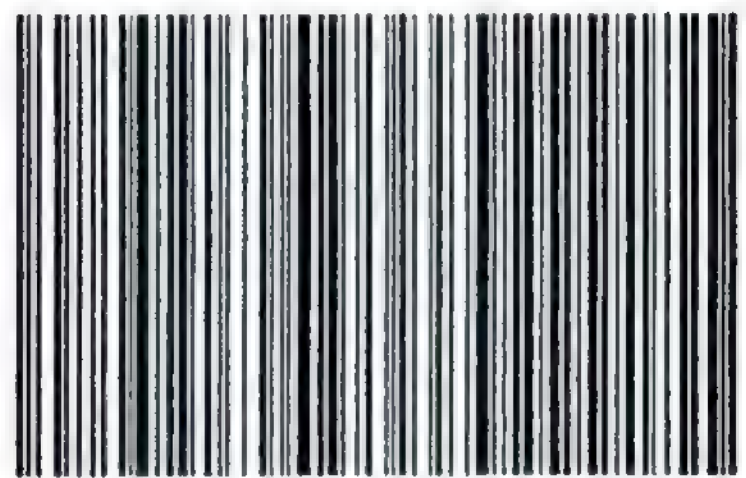
Of course, we have all the things you'd expect us to
do well. Like a 30-day, no-questions asked, money back
guarantee. A one year limited warranty with 100% parts
labor coverage. On-site service in your home or office,
24-hour free tech support for life by phone or fax.
If you have any questions at all about our computers
company, just give us a call at 1-800 PC Brand.
Just turn the page. There are a lot more big cuts you'll
want to look out for.

PC BRAND™
NOT JUST A PC.

CALL 1-800-PC BRAND

1-800-722-7265 FAX 800-722-7392

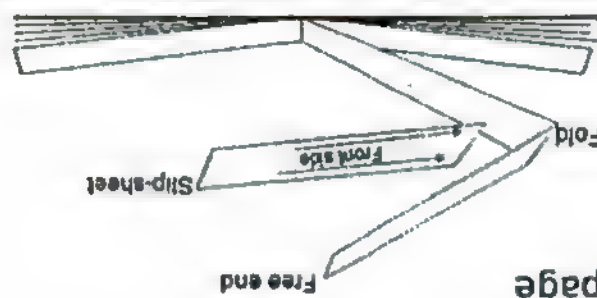
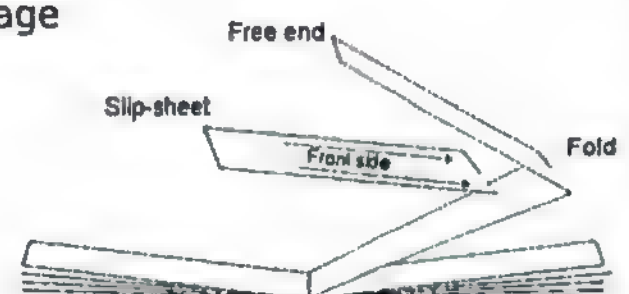
Inverted Foldout slip-sheet



GbsSlipSheet-001

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Front side touching the free page

2. Arrow pointing to the fold

3. Slice the folded edge

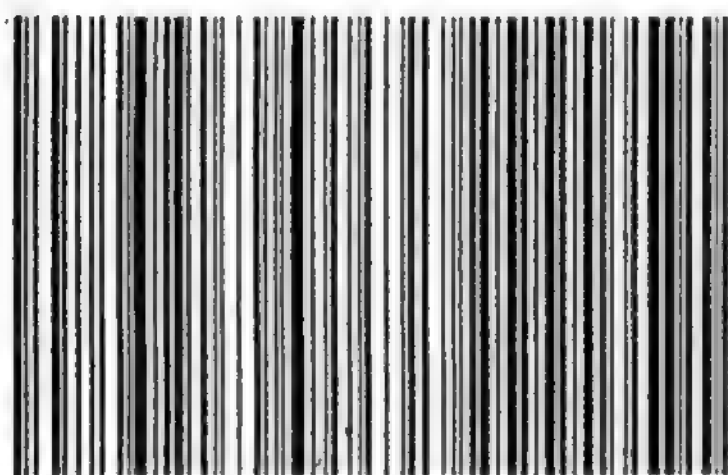
4. Close the page and slip-sheet

Open the foldout page

Insert this sheet with

1. Follow instructions on the other side

Inverted Back



GbsSlipBack-0018

Back

1. Follow instructions on the other side

TIM

\$1,995

386/40V CACHE SYSTEM

Lease: \$75/month



386, 40MHz Processor with 64K cache • 4MB RAM • 1.44MB, 3.5" drive • 1.2MB, 5.25" drive • 200 MB IDE, 18ms hard drive • 16-bit SVGA with 1MB • Super VGA color monitor (1024 x 768 resolution) • 101-key enhanced keyboard • Serial mouse • MS-DOS® 5 • MS Windows™ 3.1

\$2,300

486/33V CACHE

Lease: \$90/month



486, 33MHz Processor with 64K cache • 4MB RAM • 1.44MB, 3.5" drive • 1.2MB, 5.25" drive • 200 MB IDE, 18ms hard drive • 16-bit SVGA with 1MB • Super VGA color monitor (1024 x 768 resolution) • 101-key enhanced keyboard • Serial mouse • MS-DOS® 5 • MS Windows™ 3.1

We just leveled our prices. And that's only one of the reasons for buying a PC Brand.

PC Brand is a technology-driven company with an engineering team that's over 100 strong. We design our computers from the ground up, unlike many companies who simply assemble components they've purchased.

Our engineers have over a dozen patents and more coming in every year. One of their most impressive patents is for our Intelligent Write Buffer.™

An innovation that accelerates 80% of all processor operations in many of our 386 and 486 machines. We were the first to develop this technology, and our PCs are the only ones that have it.

Our computers also do a better job at managing power than others. Once again, this is because a lot of other PCs are put together from parts that weren't necessarily designed to go together. So they don't run as efficiently. By engineering our own machines, we don't have this problem.

INFO-BIT

Most companies buy their BIOS from an outside source. But at PC Brand, we design our own. So you get a BIOS that comes with extra features. Like password security, memory expansion, 5 different language options, and set-up screens that automatically configure drives.

USER UPGRADABLE SERIES

386/SX-25 SYSTEM

- 386SX, 25MHz Processor
- 4MB RAM expandable to 32MB
- 1.44MB, 3.5" drive
- 1.2MB, 5.25" drive
- 100MB IDE, 18ms hard drive
- 16-bit SVGA, 512K
- Super VGA color monitor (1024 x 768 resolution)

- 1 parallel port/2 serial ports
- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1

Lease for **\$1,595**
\$60/month

486/SX-20 SYSTEM

- 486SX, 20MHz Processor
- 4MB RAM expandable to 32MB
- 1.44MB, 3.5" drive
- 1.2MB, 5.25" drive
- 100MB IDE, 18ms hard drive
- 16-bit SVGA, 512K
- Super VGA color monitor (1024 x 768 resolution)
- 1 parallel port/2 serial ports

- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1
- Intelligent Write Buffer™

Lease for **\$1,995**
\$75/month

386/33 CACHE SYSTEM

- 386, 33MHz Processor with 64K cache
- 4MB RAM expandable to 32MB
- 1.44MB, 3.5" drive
- 1.2MB, 5.25" drive
- 200MB IDE, 18ms hard drive
- 16-bit SVGA with 1MB
- Super VGA color monitor (1024 x 768 resolution)
- 1 parallel port/2 serial ports

- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1
- Intelligent Write Buffer™
- 32 Bit Architecture

Lease for **\$2,395**
\$90/month

486/33 SYSTEM

- 486, 33MHz Processor
- 4MB RAM expandable to 32MB
- 1.44MB, 3.5" drive
- 1.2MB, 5.25" drive
- 200MB IDE, 18ms hard drive
- 16-bit SVGA with 1MB
- Super VGA color monitor (1024 x 768 resolution)
- 1 parallel port/2 serial ports

- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1
- Intelligent Write Buffer™
- 32 Bit Architecture

Lease for **\$2,795**
\$105/month

386/SX-25 CACHE SYSTEM

- 386SX, 25MHz Processor with cache
- 4MB RAM expandable to 32MB
- 1.44MB, 3.5" drive
- 1.2MB, 5.25" drive
- 100MB IDE, 18ms hard drive
- 16-bit SVGA, 512K
- Super VGA color monitor (1024 x 768 resolution)
- 1 parallel port/2 serial ports

- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1
- Intelligent Write Buffer™

Lease for **\$1,745**
\$65/month

386/SX-16 SYSTEM

- 386SX, 16MHz Processor
- 2MB RAM
- 1.44MB, 3.5" drive
- 40MB IDE hard drive
- 16-bit SVGA, 512K
- Super VGA color monitor (1024 x 768 resolution)
- 1 parallel port/2 serial ports

- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1

Lease for **\$1,195**
\$46/month

486/33 EISA CACHE TOWER

- 486, 33MHz Processor
- External zero-wait state
- 64KB static RAM cache
- 8MB RAM expandable to 64MB
- 1.44MB, 3.5" drive
- 1.2MB, 5.25" drive
- 200MB IDE, 18ms hard drive
- 16-bit SVGA with 1MB
- Super VGA color monitor (1024 x 768 resolution)

- 1 parallel port/2 serial ports
- 101-key enhanced keyboard
- Serial mouse
- MS-DOS® 5
- MS Windows™ 3.1
- Tower Case
- Intelligent Write Buffer™

Lease for **\$4,395**
\$155/month

• Custom configurations available.

• All major credit cards, checks, money orders, direct wire, and approved purchase orders accepted.

• TRW Customer Service Division. Free one year on-site service on desktop and tower systems is available to most locations in the United States.

• PC Brand reserves the right to amend specifications and prices without notification. All non-PC Brand products or services are identified by the trademarks or service marks of their respective companies.

• Rates based on a 36 month open-end lease. Call for additional leasing options. Leasing available to qualified businesses only.



PC BRAND™
NOT JUST A PC.

CALL 1-800-PC BRAND

1-800-722-7263 FAX: 800-722-7392

PCM1092

© 1992 PC Brand, 405 Science Dr. Moorpark, CA 93021

custom reports. Some packages, such as Great American Software's *One-Write Plus Accounting Works*, let you extract account data to the spreadsheet of your choice, so you can perform your own personal brand of data analysis.

Sadly, most of the products we reviewed don't meet these usability criteria or meet too few. With some notable exceptions, vendors are embroiled in a features war—a kind of accounting arms race that benefits big companies with sophisticated accounting needs, but ignores young businesses just emerging from the

shoe box. All too many products still provide screens and reports cluttered with useless information.

THE FUTURE: WINDOWS?

By contrast, the recent crop of Microsoft Windows products shows real promise. Utilizing the graphical environment to provide screens that look like business forms with fonts that increase readability, the best of these programs place reasonable limits on cumbersome functionality

that gets in the way of so many potential users. In fact, many developers of Windows products have chosen to avoid the features war by deliberately pursuing a kinder, gentler market.

Such basic Windows capabilities as point-and-shoot operation, use of dedicated task icons, the ability to open several screens or modules in separate sessions, and access to sophisticated printing can be turned to solid advantage.

Printing in particular has interesting implications here, since a major expense associated with computerized accounting

GLOSSARY: Accounting as a Second Language

by Jay P. Hartig and Raymond A. August

Accounts Payable The money you owe to vendors for goods or services received. The term also refers to an accounting system that tracks this information.

Accounts Receivable The money your customers owe you for goods or services you have provided; also, an accounting system that tracks this information.

accrual basis A method of accounting that records transactions as they occur rather than waiting until cash is exchanged. See *cash basis*.

aging Separating transactions into groups by date. For example, an aged receivables report sorts invoices according to the date when payment is due.

audit trail Information captured by the accounting system that allows you to reconstruct how a transaction affected each account balance, who performed the processing, and so on.

bill of materials A list including the name and price of each material or part required to manufacture a finished product. It sometimes shows the processing cost (labor and overhead) at each stage of production.

cash basis An accounting method that reflects only cash activity. Revenue is recorded when cash is received, and expenses are recorded when cash is disbursed. This is contrasted with *accrual basis*.

cash disbursements Money paid out, generally by check, to vendors for goods and services.

chart of accounts A complete list of a business's account names and numbers, usually organized into logical groupings.

debit/credit memo A notice that an account balance between two parties has been adjusted up or down. If a customer returns merchandise, for example, the vendor issues a credit memo.

fixed assets Property (owned or leased) used over an extended period of time to produce revenue for the company.

Form 941 The IRS form filed quarterly to report income-tax, FICA, and Medicare withholdings.

Form 1099 An IRS form sent to certain vendors whom you have paid more than \$600 during the year.

General Ledger The master record of a company's account balances, used to prepare financial statements and management reports.

markup The amount added to the cost of a product by a retailer.

period (or accounting period) The interval (perhaps weekly, monthly, or quarterly) at which a company regularly closes its books and generates new account balances.

post To transcribe and summarize detailed transaction data from journals or subledgers into the General Ledger.

purchase order The written authorization for a vendor to ship merchandise and bill you for it.

relieve To decrement an inventory account. When goods are sold, the inventory accounting records are relieved.

reversing transactions Recurring period-end transactions that are recorded in the books and regenerated from scratch each period. This requires that the adjustment booked at the end of the preceding period be removed from the books so that only the current period's adjustment appears.

transaction group Recurring transactions due together periodically, such as monthly rent and phone bills.

voucher A transaction-processing record that documents approvals, payment amounts, physical shipment or receipt, and the like. ■

"I'm no idiot. I can see that 3,000 visitors a day at \$10 a head adds up. I can only imagine how much they make from food sales and other stuff like those life-size posters of yours truly. All I ask is that they take good care of all that money that I'm working so hard for."



For a free Demo Disk,
call 1-800-CALL CAI.





Name: Magilla

Title: The Boss / "The Ultimate Primate"

Company: The New City Zoo

Salary: All he can eat plus free health and dental

Annual Sales: \$11,000,000

5-Year Average Annual Growth: 75%

Software: ACCPAC® Plus Accounting™

Favorite Module: "Inventory Control.

Make darn sure we never run out of bananas."

ACCPAC Plus
Accounting
Software.

More accountants
recommend it.

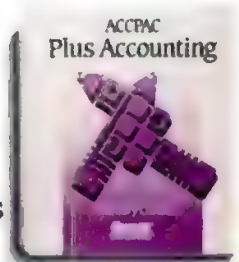
More businesses use it.

More people prefer it.

We'll show you why.

Call 1-800-CALL CAI for a free
Demo Disk of the leading accounting
software in North America.

After all, why monkey around with
anything less?



COMPUTER[®]
ASSOCIATES
Software superior by design.



SUITABILITY TO TASK

Accounting—as a term and as an activity—encompasses a multitude of tasks. We structured our Suitability to Task evaluation to cover the task-related aspects of working with accounting software, including the setup, as broadly as possible.

Using each of the products in this review, we rated Suitability to Task by setting up the accounting books of a hypothetical small business. Our team of Price Waterhouse reviewers, who are all experienced PC users, then simulated the operations of the company for one year. The simulation included basic tasks, such as recording invoices and writing checks, and complex maneuvers, such as voiding checks, making inventory adjustments, vendor payment exceptions, and recurring and reversing journal entries.

Keep in mind that some products may appear stronger in the Suitability to Task ratings than in the product reviews. The reason is that although ease of use is an important consideration for low-end accounting packages, it is only factored into each task and is not a separate task. To some extent, the industry still forces you to choose between packages that stress features and those that emphasize ease of learning and convenient, intuitive operation—at least for the time being.

Installation and setup evaluates the resources a package provides for setting up your accounts and keeping the accounting process running smoothly. Considerations include documentation, sample charts of accounts, written or on-line tutorials supplied, the clarity of installation procedures, the availability and terms of technical support, and the quality of on-line help.

General accounting evaluates a package's prowess at creating audit trails, maintaining account detail, and handling the ins and outs of double-entry bookkeeping, accounting controls, and budgeting.

Managing cash evaluates a package's capacity to track revenues and handle the inflow and outflow of money through basic Accounts Payable and Accounts Receivable functions, to produce 1099 forms, and to print checks, invoices, and statements.

Managing inventory evaluates a package's ability to process purchase orders, handle order entry, generate quotes and proposals, manage multiple warehouses, handle inventory posting and pricing, and gather accounting data at the point of sale.

Financial reporting and querying evaluates a package's ability to extract information from accounts in the form of reports. Considerations include the ability to prepare predefined, ad hoc, and user-defined reports (using a report writer); the ability to run on a cash and/or accrual basis; the ability to track multiple departments and the capacity for open periods; and the ability to update data on-line.

is the cost of business forms (see the sidebar "Consumables That Won't Consume Your Budget"). Windows packages such as *Crystal Accounting* already include desktop publishing-like forms design packages that will laser print statements, checks, and invoices on plain paper.

Perhaps more central to accounting and financial analysis is the question of data transfer. All Windows packages can take advantage of the Windows Clipboard to move numbers to compatible spreadsheets or word processors. Though no low-cost packages have yet implemented these, dynamic data exchange (DDE) and object linking and embedding (OLE) promise to make data exchange between applications even easier.

As promising as they are, the Windows packages are unseasoned. They must go through a maturation process in which feature sets are more carefully matched to user needs.

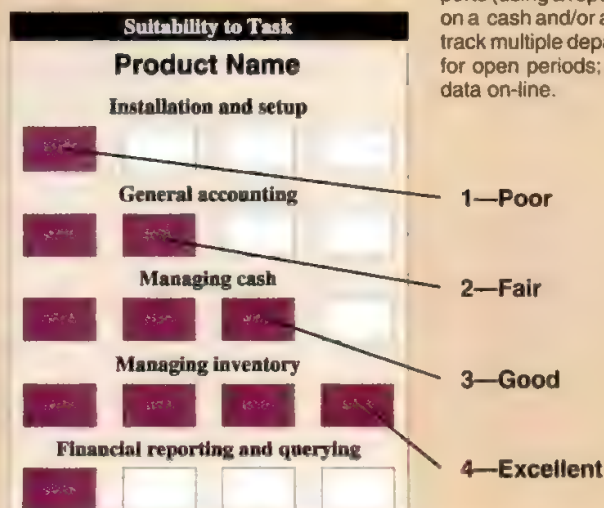
BEYOND BEAN COUNTING

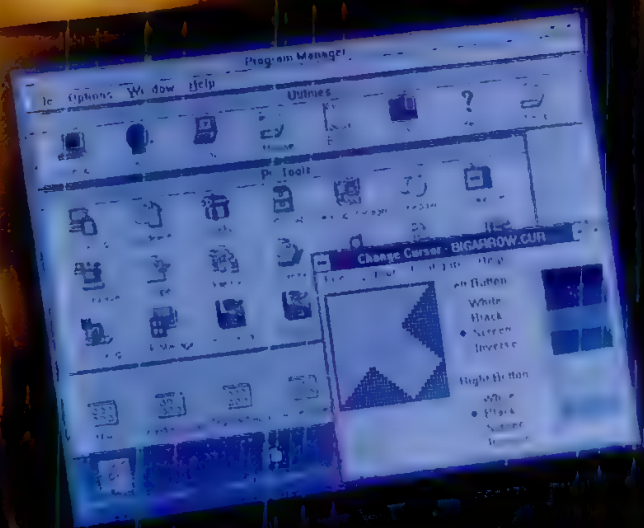
Rather than just telling you how your business *has* been run, which is what accounting software typically does, good software should give you information that will guide you proactively. For example, strong cash flow projections give you advance warning about the dollars you will need to make next month's rent, payroll, and tax payments. Collections reporting and collection-letter generation provided by Great American's *Get Paid Plus* can help make sure that your customers are paying promptly. Inventory reorder reporting can alert you when it's time to start restocking products needed to run your business.

GROWTH POTENTIAL

While ease of use is important in the early stages of automating a business, accounting power tends to gain importance as the business grows and matures. Hence, an easy upgrade path to more sophisticated accounting software is a must. The amount of effort expended over a period of months or years in creating and maintaining an accounting system constitutes a kind of *sweat equity* that one shouldn't have to abandon when the time comes to move on. Several vendors of low-end packages, such as Computer Associates International, CYMA Systems, and Platinum Desktop Software, also offer packages with higher functionality and compatible data formats or simple format conversion.

However, if the upgrade is not com-





Introducing the first notebook computer designed to make Windows™ a breeze.

Just turn it on and go. It's that simple. The new TI TravelMate™ 3000 WinSX™ package is engineered to meet the challenges of running Windows on a notebook computer. That's why it comes with MS-Windows® 3.0 and MS-DOS® 5.0 already installed on the 60MB hard drive. So within seconds, you're into Windows and ready to load your application software.

But the TM3000 WinSX offers so much

more. Like clicking in and out of applications with a specially designed pointing device. An extra-large, easy-to-see cursor that keeps your place as you move from screen to screen.

And Battery Pro™. Designed to extend battery life when working in Windows, it suspends functions you're not using while keeping calendars and other background programs current. So you can pick up

where you left off.

Best of all, these Windows features, and more yet, come in the industry's smallest, thinnest and lightest 386SX™ 20 MHz notebook computer.

Finding out more is a breeze, too. For the name of a dealer near you, call 1-800-527-3500.



**TEXAS
INSTRUMENTS**

MS-Windows and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. TravelMate, WinSX and Battery Pro are trademarks of Texas Instruments Incorporated. MKSX is a registered trademark and the Intel Inside logo is a trademark of Intel Corporation.

© 1992 TI 71094

CIRCLE 304 ON READER SERVICE CARD

mand and interface compatible, much of the potential benefit can be lost. The ACCPAC family of accounting software products, for example, has grown primarily through product acquisition rather than research and development. When you upgrade within this product family, your data is compatible, but you must learn a new interface, new concepts, and new procedures. In contrast, a software upgrade from *BusinessVision II* to *BusinessVision Turbo* preserves your knowledge base. You don't have to concern yourself with learning a brand-new package.

WHAT PRICE?

In the early to mid 1980s, a complete Peachtree system would have set you back about \$5,000. Today, the same functionality can be purchased for \$199. Several other highly acclaimed packages sell for between \$50 and \$150. That's a pretty astonishing change. But how important a consideration should price be for a small-business owner choosing an accounting package?

A \$300 package that you can set up in an hour is more economical right off the bat than a \$100 package that requires 20 hours of setup time (assuming you value your time at \$15 or more per hour). A more costly system that completes day-to-day work in 80 percent of the time a cheaper package takes will probably pay off the purchase price difference in something between a few hours and a few weeks.

SPECIAL INTERESTS

Accounting-software vendors often add value in the form of special features that address the needs of particular businesses. For example, companies with more than a handful of employees want a Payroll module to handle salary checks and the extensive paperwork related to payroll deductions. Consultants and law offices may want to look for a package with time and billing functions. Bills of Materials are a potential asset to many types of manufacturing and distributing businesses, and a Job or Project Costing module, like the one in *Access to Platinum*, could prove valuable to any number of companies.

Small retail operations might look for a point of sale system, such as the one included in *Manage: Complete*, to record transactions for accounting purposes as they are rung up on the cash register. Fi-

nally, many businesses higher up on the maturity curve can benefit from a package, like Hooper International's *Takin' Care of Business*, that offers a wide variety of financial ratios and other financial-management tools. Similarly, data import/export compatibility with spreadsheets and other analytical software may be very valuable to a broad cross section of small businesses.

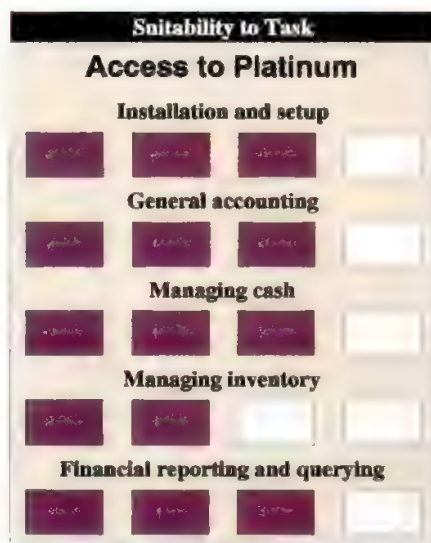
If you think your special needs might be best served by any of the features mentioned above, read the Summary of Features carefully. Cross-check with the reviews of any products that seem promising to get our assessment of how successfully the features have been implemented and for an overall assessment of the package. But don't make a purchase decision without also reading the sidebar "Small-Business Futureware: Intuit's QuickBooks," in which we discuss the soon-to-be-released *Quickbooks* package. It promises to be an outstanding solution for small businesses.

Access to Platinum

Reviewed by Thomas White

Access to Platinum, Version 2.5, is a Microsoft Windows accounting package from Platinum Desktop Software whose sister company, Advanced Business Microsystems, developed the high-end *Platinum Accounting Series*. However, don't assume that this \$249 package is a scaled-down version of *Platinum*. Acquired from Computer Trends when the product was known as AXS, *Access* is designed specifically for the small business. Although *Access* provides some strong accounting features, small businesses new to accounting software will find it more difficult to implement and use than its Windows competitors.

Access consists of nine modules—General Ledger, Accounts Payable, Accounts Receivable, Checkbook, Inventory, Job Costing/Time Billing, Payroll, System Manager, Company Information—and a helpful Tutorial. Unlike the other Windows products, *Access* provides an icon for each module, so you can select the ones you want to use in each work session. This approach helps conserve system memory.



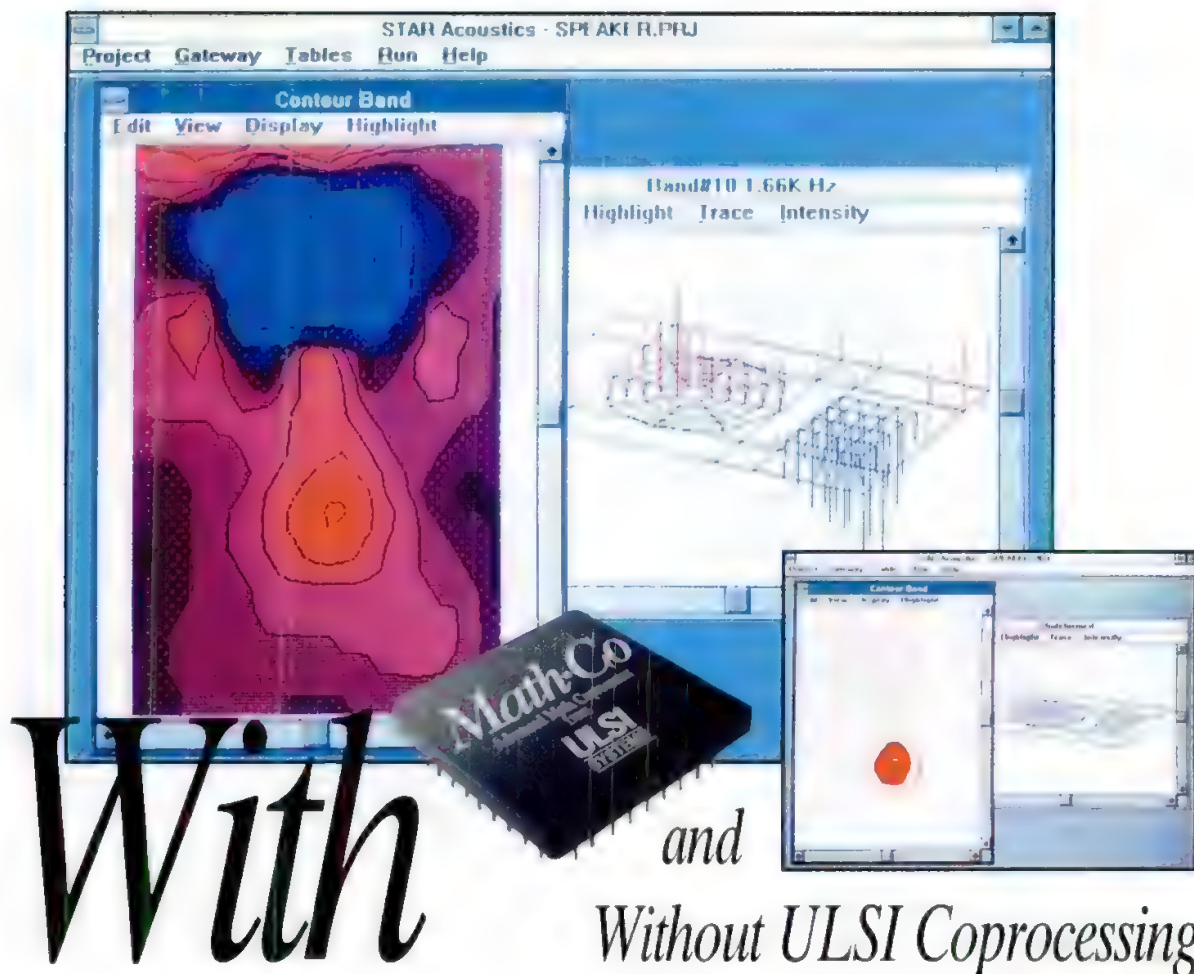
HELP WHERE YOU NEED IT

Eight sample charts of accounts and an on-line tutorial help you set up. The package's on-line help follows the Windows hypertext conventions and is accessible at any time. *Access* does a good job of implementing other Windows capabilities, including full MDI support and some WYSIWYG screen forms. A notable omission is dynamic data exchange (DDE), although *Platinum Desktop* has promised to include it in an upgrade that is due out by the time you read this. Printed documentation is adequate although thin on detail in some areas.

Access allows you to create account IDs of up to 20 digits in length. With this many characters, it's easy to organize accounts into departments or other structured groupings. Account transactions are posted to the current period only, but if you need to post to future or prior ones, you can change the working date. *Access* stores detail transactions for a minimum of two years. For those low on disk space or who want to improve response time, the option to purge data more frequently would be a useful enhancement.

Voiding checks and deleting data within *Access* is simple. Just call up the item you want to delete or void and select the Delete option. *Access* does not actually delete data but automatically reverses the transaction and reinstates the voucher. You can delete or reverse any type of transaction within the system while maintaining a complete audit trail.

If you occasionally receive something other than cash as payment for an outstanding invoice, you will find *Access*'s trade-off feature useful. If, for instance, you agree to accept an asset in place of



With

and

Without ULSI Coprocessing

Not just another math coprocessor—the ULSI Math-Co™ is state-of-the-art, full double-metal CMOS 1.0μm technology. Designed with all the enhancements and performance features one would expect from leading edge silicon valley technologists, the Math-Co will increase your computing speed by up to 500%.

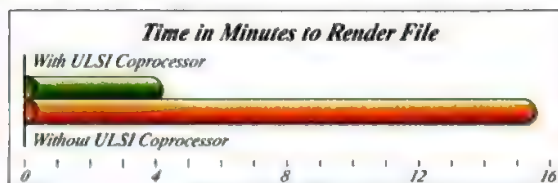
You can take advantage of over 2,100 different software applications designed to handle the floating point instructions necessary for screen redraws, regenerations, zooms, and other math intensive operations on 386™ computers.

Price performance leader—ULSI has incorporated in this new generation math coprocessor many performance enhancements not found in ordinary coprocessors.

- Reduced (by as much as 75%) number of clock cycles needed by the Intel 80387 to do floating-point mathematics.

- Built in automatic sleep mode to reduce battery drain in SX lap-top computers.
- Reduced power consumption, and heat radiation for the industry's best Mean Time Between Failure (MTBF) rating.
- Reduced noise sensitivity for superior hardware compatibility.

Lifetime Warranty—ULSI Math-Co's superior design allows us to offer the industries first lifetime warranty.



Wise choice—To get the finest math coprocessors available, call your local computer dealer or contact ULSI North America (512) 795-8033 or ULSI Europe 0734-462247 for the name of the dealer nearest you.



Math-Co

The Original Math Coprocessor
from

**ULSI
SYSTEMS**

Math Co is a registered trademark of ULSI Systems. Other product names are trademarks and/or trade names of their respective manufacturers. Screen shots courtesy of Structural Measurement Systems, a GenRad Product line.

Seems like ev missed the bu

**NEC's unique local video bus lets
you see graphics 200% faster.**



The Image Series was designed to take advantage of NEC's new MultiSync FG monitor line, which includes our FullScan™ technology. It gives you edge-to-edge images in a much larger display area. Combine it with an Image Series PC and you'll not only see your information faster, you'll see more of it.

■ Looking to get to your graphics faster? Well, there's just one thing to do. ■ Catch the bus. ■ NEC's local ImageVideo™ bus. The only local video bus to come standard on a personal computer. Available on the PowerMate® SX/20i and the 386/33i, it's a dedicated path for video data that operates at the same speed as the processor. ■ So you can see your graphics at lightning speeds. More than twice as fast as our closest competitor. Pretty fast for a local bus, wouldn't you say? ■ But our local video bus is just one of many reasons why the Image™ Series personal computers are taking the computer world by storm. ■ There's also our unique, integrated motherboard. It has a microprocessor, state-of-the-art cache and expandable memory built in. That way, with

a simple system board exchange you can easily upgrade to the next generation. ■ What's more, our Image Series personal computers are designed so that all



NEC
POWERMATE®
386/33i

NEC
POWERMATE®
SX/20i

COMPAQ®
DESKPRO
486/33

IBM®
PS/2 95
486/25

AST®
BRAVO
486/25

SECONDS

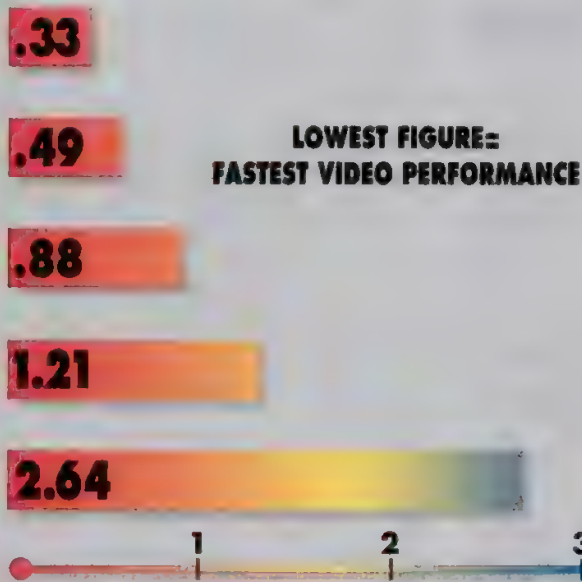
C&C

Computers and Communications

everyone else has S.

these pieces always work together with peak precision. ■ The PowerMate SX/20i and 386/33i also have 800 x 600 SuperVGA resolution that can expand to 1024 x 768 with 256 colors. Our proprietary

ImageSync™ technology which automatically produces flicker-free graphics when used with NEC's new MultiSync® FG™ series monitors. SIMM sockets for easy and affordable memory upgradability. And FLASH-ROM for simple BIOS maintenance via diskette or network. ■ Even their modular design will impress you. It gives you easy access, so maintenance is effortless. For instance, to open the chassis, just turn the plastic thumb screw and the cover opens up instantly. ■ But what may just be the best part of the Image Series has nothing to do with the comput-



PC Magazine Labs (5.0)
Video Performance Test: Direct Screen Access

ers. And everything to do with the price. ■ Never before has so little gotten you so much. ■ If you'd like more information on our local video bus, or any of the Image Series personal computers (as if there isn't enough information in this ad), call us at 1-800-NEC-INFO or NEC FastFacts, at 1-800-366-0476, # IMAGE (46243). For those of you in Canada, call 1-800-343-4418. ■ Because if you miss our bus, you might not see another for a very long time.

Because ↑ is the way you want to go.

NEC

cash, *Access* allows you to relieve the receivable easily and update the appropriate asset account from one screen.

GOOD REPORTING . . . AND NOT SO GOOD

Rather than providing numerous standardized G/L reports, *Access* allows you to define the data you want included on your reports through its Reports Settings option. Here, you can define accounts/vendors/customers/items, whether you're using actual or budget data, periods to report on, and so on. This approach provides enough flexibility to meet most businesses' reporting needs. However, it will take you some time to become proficient. A helpful enhancement would allow you to save each of your settings for recurrent use.

Aging reports for both A/P and A/R allow you to define your own aging dates. Unfortunately, in reports themselves, *Access* prints only summary information: the total amount due to or from each vendor or customer for each aging category, but not the individual invoice amounts that comprise that summary number. Further, the A/P module does not offer a check preview report prior to printing your checks.

The A/R module captures sales order information, although it does not allocate inventory until orders are invoiced. The program produces two types of invoices: one for the sale of inventoried items and one for noninventoried items. The fully integrated Job Costing module is useful for those who need to track revenues and costs to particular projects. *Access*'s Payroll module prints quarterly tax and W-2 reports, but it does not print the actual forms.

Access's A/P module includes limited purchase order (P/O) capabilities. It can capture P/O information and produce purchase reports, but P/O activity does not update inventory data. *Access* also is unable to print a formal P/O report. The Inventory module maintains basic item information, including average cost, quantity on hand, unit selling, and last unit cost. It can also print a physical count worksheet and an inventory-items listing showing purchase and sales details.

MULTIFACETED

Also available in DOS and OS/2 versions (at \$169 each), *Access* displays consistent functionality across platforms. Further, Platinum Desktop Software should have

LAN versions available by the time you read this. If you decide to move from one version to another, or on to the high-end *Platinum Series*, your data files will be converted automatically.

Considered solely on the strength of its accounting features, *Access to Platinum* matches or beats any Windows accounting package. The flexibility of its user-defined reporting is reminiscent of costlier systems, and its ability to run on DOS, Windows, and OS/2 offers some platform independence. However, *Access to Platinum*'s added features and flexibility are more difficult to implement than those of its Windows competitors.

FACT FILE

Access to Platinum, Version 2.5

Platinum Desktop Software Inc., 15615 Alton Pkwy., #300, Irvine, CA 92718; 800-999-1891.

List Price: \$249.

Requires: 3MB RAM, DOS 3.0 or later, Microsoft Windows 3.0.

CIRCLE 474 ON READER SERVICE CARD

ACCPAC Simply Accounting for Windows

by Thomas White

ACCPAC Simply Accounting for Windows, Version 1.0c, is Computer Associates International's \$199 Microsoft Windows-based accounting package for small businesses, and as the name suggests, it's extremely easy to use. It provides General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory, and Job Costing modules that handle the basic tasks. Its inability to handle functions like setting payment terms by vendor or sales tax rates by customer may prove to be a serious limitation for some small businesses, but Computer Associates does offer an upgrade path to the midlevel *ACCPAC BPI* or the high-end *ACCPAC Plus*. A utility converts data files between programs so you won't miss a step. Unfortunately, procedures are not consistent between packages.

Most users should be able to master

Suitability to Task

ACCPAC Simply Accounting for Windows

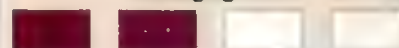
Installation and setup



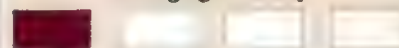
General accounting



Managing cash



Managing inventory



Financial reporting and querying



Simply Accounting in a short time. A ten-page accounting manual provides assistance to the accounting novice, and the on-line help offers a Procedures option that lists in detail the steps necessary to perform the primary accounting functions.

Simply Accounting provides six sample charts of accounts and gives you the option of creating your own. The G/L module allows for standard transaction input and also lets you allocate transaction amounts per project by percentage. In addition, the A/P module incorporates a handy control feature that prevents you from creating duplicate invoices.

Simply Accounting's G/L does not track budgets or provide recurring or reversing entry capabilities. Those who carefully manage cash flow will also be disappointed by the program's inability to capture discount percentages or invoice due dates; it can capture only the date of the original invoice. It is also disappointing that Computer Associates did not see fit to implement support for the Windows Multiple Document Interface (MDI), which allows multiple files, like A/R and A/P, to be open concurrently.

To keep things blessedly simple, the A/R and A/P modules are designed to look almost identical. You can enter sales invoices that will relieve inventory when posted, but your invoices can include noninventory items as well. *Simply Accounting* even checks customer credit limits prior to posting invoices and warns the user if the limit has been exceeded.

Simply Accounting's Inventory system values its inventory using the average cost method and allows you to assign a price and minimum stocking level for each item. The package provides a helpful Inventory

Synopsis report, which lists the value of each inventory item and its current margin or markup. A helpful enhancement would be to assign the sales tax, finance charge, and freight percentage defaults for customers individually, not once for the whole system.

The bottom line is that *Simply Accounting* should be considered only if you have the most basic accounting needs and you feel lost in the world of debits and credits. Even so, several other Windows products are nearly as easy to use and offer more flexibility and functionality.

FACT FILE

ACCPAC *Simply Accounting for Windows*, Version 1.0c

Computer Associates International Inc., 1240 McKay Dr., San Jose, CA 95131; 800-531-5236, 408-432-1727.

List Price: \$199.

Requires: 1MB RAM, DOS 3.1 or later, Microsoft Windows 3.0.

CIRCLE 475 ON READER SERVICE CARD

Act 1 Plus

by Raymond A. August

If you have an accounting requirement, Cougar Mountain Software's \$199.50 *Act 1 Plus*, Version 8.2, has a module to meet the challenge. *Act 1 Plus* integrates General Ledger, Accounts Payable, Accounts Receivable, Purchase Order, Order Entry, Inventory, Payroll, Check Reconciliation, and LYNX, a utility used to import and export data. Fully integrated Job-Cost and Point-of-Sale modules are available for \$199.50 each; a custom Report Writer is also an additional \$100. While undeniably powerful, this package is not among the easiest to use.

MANUAL MODIFICATION

Current *Act 1* users will be glad to hear that the documentation has been completely reworked. The 1,800-page user manual has been converted to an excellent context-sensitive, on-line help system. The now-manageable 700-page manual covers accounting procedures and includes a thorough, well-designed tutorial with matching sample data that takes you on a tour through most of *Act 1*'s features. Lending an interesting twist, the manual

often refers you to the on-line help!

To ease the start-up process, *Act 1* provides shell (dummy) companies for the service, retail, wholesale, and manufacturing industries, plus one for generic companies. These shells can preconfigure *Act 1*'s chart of accounts, reports, and system defaults. The addition of point-and-shoot menus has helped clean up the interface, but *Act 1* still has a way to go in this respect.

Act 1 facilitates the entry of basic system data at any time with on-the-fly master file records for customers, vendors, inventory items, and accounts. It also adds some control by allowing you to decide on a module-by-module basis whether this feature should be activated. So if you don't want your Accounts Payable clerk adding account numbers, simply disable this feature.

MEATY MODULES

Act 1's G/L module allows account numbers of up to 15 digits in length—plenty of room for departmental prefixes and other customization—and can consolidate as many as 30 companies. The G/L also provides for recurring journal entries based on fixed amounts or percentages, and it has a Report Writer for generating customized financial reports. However, most transactions are entered one leg at a

time, making data entry inefficient and laborious.

The A/P module has some truly innovative features. If you have international vendors, it allows for currency conversion during data entry. Entries for prepaid transactions, such as insurance, are elegantly handled, and invoices can be automatically spread by percentage to different departments or accounts.

Order Entry manages up to six different price levels per item and can handle goods or services. To simplify customer lookup during or-

der entry, *Act 1* lets you search for a customer by name, number, or telephone number. You can add up to 250 lines of comments per order to assist in tracking unique orders or to provide extensive product descriptions. All of *Act 1*'s forms, including invoices and statements, can be customized.

Act 1's Inventory module supports FIFO, LIFO, weighted average, and standard costing. Numerous helpful reports are available, including movement or activity reports to help manage your inventory. *Act 1*'s use of inventory-reorder points to generate purchase orders automatically is a great materials-management feature. The Payroll module offers distinctive features, such as the ability to print directly on the IRS Form 941. In fact, Cougar Mountain supplies tax tables annually, free of charge.

IMPROVEMENTS WANTED

Act 1 could use better on-screen prompts to clarify its difficult-to-use data entry screens. For example, in making a journal entry, you must signify a 1 for a credit and a 0 for a debit. Currently, the only way to figure this out is to call up help. Better yet, Cougar Mountain could modernize the interface.

Act 1 would also benefit from improved system speed. Working on a 386 computer, we experienced noticeable delays navigating between screens and accessing lookup windows and help screens. Further, *Act 1*'s numerous menu choices, mandatory reports, and its heavily controlled batch-orientation environ-

*Current Act 1 users
will be glad to hear
that the documentation
has been completely
reworked.*

Suitability to Task

Act 1 Plus

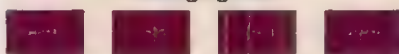
Installation and setup



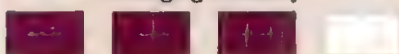
General accounting



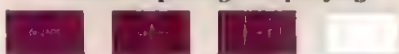
Managing cash



Managing inventory



Financial reporting and querying





The award winning T2200SX

If you need any more power than this

If your desire for power is on the scale of say, Louis XIV, consider the Toshiba T2200SX. Weighing a mere 5.5 pounds and taking up just half a briefcase, it possesses an awesome 20 MHz 386SX microprocessor and a 40, 60 or 80 MB hard drive with 2MB RAM expandable to 10 MB. And it's powerful enough to have grabbed both a PC/Computing MVP award and a PC Magazine Technical Excellence Award.



The new T3300SL

maybe you should get into politics.

If your need for power is on the scale of say, Napoleon, consider the new T3300SL. It offers a 25MHz 386SL microprocessor plus 64 KB cache for blazing speed and longer battery life. Not to mention an 80 or 120MB drive and a PCMCIA-compatible slot. And like its cousin the T2200SX, it offers a Nickel Hydride battery and a carbon-fiber reinforced case. So call 1-800-457-7777. Or if you want even more power, don't forget it's an election year.

In Touch with Tomorrow
TOSHIBA

ment can make month-end processing an extensive project.

Cougar Mountain's *Act 1 Plus* provides excellent functionality at the occasional cost of usability. If you have the expertise to utilize *Act 1 Plus*'s features, though, it will pay you handsome returns.

FACT FILE

Act 1 Plus, Version 8.2

Cougar Mountain Software, 2609 Kootenai, Boise, ID 83707; 800-388-3038.

List Price: \$199.50.

Requires: 640K RAM, DOS 3.1 or later.

CIRCLE 476 ON READER SERVICE CARD

BusinessVision II

by Raymond A. August

In the arena of small-business accounting packages, *BusinessVision II*, Version 2.5, from BusinessVision Management Systems, represents a mixed bag. Although it excels in sales reporting and billing, it is hampered by a weak Accounts Payable module.

Initial setup for this \$225 package is straightforward. The vendor provides only one chart of accounts to get you started, but you'll probably end up creating your own. An on-line tutorial guides you through the operation of the various modules.

BusinessVision's A/P module exhibits little strength or flexibility. Transaction entry is cumbersome, and if automatic or on-line posting is enabled, individual vouchers can be coded and posted to only one expense account. There is no concept of voucher due date. Instead, vouchers are listed as payable upon entry, which greatly reduces the program's ability to perform cash-requirements planning. Vendor checks must be printed one at a time, and there is no support for voiding checks. One bright spot: 1099 forms can be tracked and printed.

FLEET-FOOTED SALES TRACKING

BusinessVision excels in tracking and reporting product sales. Strong order-processing features, such as backordering, printing of quotations, and tracking of multilevel sales tax and Canadian GST, make this one of the strongest order entry systems we reviewed. *BusinessVision*

SOFTWARE PRICE WATERHOUSE REPORT

strengthens this module further by including capable point-of-sale (POS) processing. Simply by attaching a cash drawer and receipt printer, you can transform *BusinessVision* into a fully integrated POS solution for a retail store.

BusinessVision's sales reporting is equally adept. Sales Analysis reports can be printed in summary or detail for daily sales, customer, salesperson, inventory item, and profit earned on each. The addition of sales-commissions tracking would be a nice touch, however.

The Inventory module also reflects *BusinessVision*'s sales orientation. When performing an account inquiry, you can view sales by month and by the gross margin earned on the sale of that item. *BusinessVision*'s Autopost feature lets you post transactions between modules automatically, or if you prefer batch orientation, accumulate and post transactions in a batch mode.

STAYING IN FORM

All *BusinessVision* forms can easily be customized and printed on plain paper. Both U.S. and Canadian Payroll modules are available, and all data can be exported to standard comma-delimited files for use in your favorite spreadsheet or database.

BusinessVision also offers *BusinessVision II Turbo* for \$1,295 as a stand-alone version and \$1,790 for a LAN version, which provides fully integrated modules for Purchase Orders, Job Costing, Bill of Materials, and General Ledger consolidation.

If you want to enhance your organization's sales and order processing func-

tions and can accept a myopic A/P module, then consider *BusinessVision II* for your accounting needs.

FACT FILE

BusinessVision II, Version 2.5

BusinessVision Management Systems Inc., 5000 Birch St., #3000, Newport Beach, CA 92660; 800-433-3384.

List Price: \$225.

Requires: 420K RAM, DOS 3.1 or later.

CIRCLE 477 ON READER SERVICE CARD

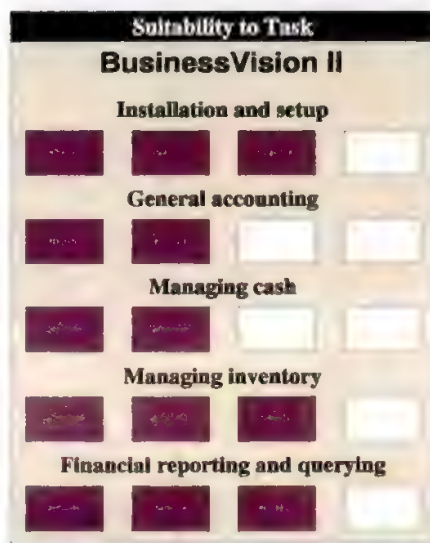
Crystal Accounting

by Thomas White

Crystal Accounting, Version 4.0, a \$249 product from Peachtree Software, was the first Microsoft Windows-based accounting package to hit the market. Sadly, it fails to implement a number of Windows niceties we've become accustomed to in other applications, such as multiple fonts and graphics. Nonetheless, those looking for basic accounting functionality in the Windows environment might well consider *Crystal*, which consists of General Ledger, Accounts Payable, Accounts Receivable, Invoicing, and Payroll modules, plus a Financial Report Writer.

Experienced Windows users will find *Crystal* easy to get acquainted with. Its logical layout, sample data, tutorial, and prominent use of dedicated on-screen task icons speed the start-up process. Once set up, *Crystal*'s ability to add customers and vendors on the fly during data entry contributes to the program's ease of use, as does its ability to perform instant lookups on a number of key data fields. Users familiar with Windows capabilities may be puzzled to find that while *Crystal* supports dynamic data exchange (the only package we review that does), it does not support the Windows multiple document interface.

Crystal gives you great flexibility in defining the number of periods in the accounting year and the dates for each period. Account numbers can be as large as ten characters, which makes it easy to incorporate structures to designate departments and divisions. *Crystal* allows you to set up an unlimited number of checking accounts. Further, you can maintain budgets for each account and period,



Take The Money And Run!



Take the Money With **All ^{NEW!} DacEasy® Point of Sale™**

New DacEasy Point of Sale is the perfect stand-alone point of sale system for every size business that also integrates fully with DacEasy Accounting 4.2! New Point of Sale turns any 286 or better PC into a powerful Point of Sale system and it's compatible with PC-Based point of sale hardware, too.

Anyone Can Use It!

You don't have to be a computer genius to use DacEasy Point of Sale. Install it in minutes and perform all sales activities from one screen such as scanning bar codes, tracking customers, processing layaways and credit-card transactions, accessing product prices and information, tracking inventory and more. Since it's so easy to use, you'll speed up your sales transactions which will increase sales.

Customize It to Meet Your Needs.

The DacEasy Point of Sale interface can be customized to work the way you need it to. And it prints invoices and receipts with custom headers and sales messages, giving your business the flexibility to meet growing demands.

Reports That Keep You Informed.

DacEasy Point of Sale's reports help you manage your daily transactions such as sales by product, sales person and customer, credit transactions, layaways, returns, receipts by payment method, audit tape and more!

Integrate With DacEasy Accounting 4.2!

Best of all, DacEasy Point of Sale can integrate with DacEasy Accounting to provide complete inventory management and streamline your accounting activities! Use them together and you'll find there's no better way to take the money and run your business.

Run Your Business Easily With **DacEasy® Accounting 4.2**

Over one million businesses have learned the advantages of using DacEasy Accounting to manage their books. Its 12 integrated modules make running your business easier than ever: General Ledger, Accounts Receivable, Accounts Payable, Cash Management, Inventory, Product Assembly, Purchase Order, Billing, Budgeting, Graphics, Forecasting, and Report Generator. Use all of the modules or just the ones you need. Either way it's your total business solution.

Friendly Accounting.

DacEasy's logical interface and complete on-line, context sensitive help make it easy to learn and use. And the simple point-and-shoot mouse environment with transaction-oriented, pull-down menus is friendly to even the most novice of users.

Powerful Accounting.

With a complete report generator and 3-D graphics capability, DacEasy Accounting has your business covered with critical information at your fingertips. And printing Invoices, Purchase Orders, Statements, Credit Memos and other forms are a keystroke away.

The Most Award-Winning Accounting.

Over the past six years, DacEasy has won more awards than all other Accounting software combined. Plus, we're proud of having the industry's largest support staff and quality DacEasy Certified Consultants nationwide, all professionally trained to provide complete support should you ever need it.

Unmatched Value.

Nothing matches DacEasy's combination of power, simplicity and value. Add DacEasy Point of Sale to the equation and running your business will be easier than you ever imagined.

Network Versions Also Available

Network versions of DacEasy Accounting and Point of Sale are also available for just \$299.95 each, or check out the special network offers in the single-user packages! These NetBIOS compatible systems have the same features as the single user versions but allow unlimited access with multiple PCs - just think of the possibilities!

See Your Local Dealer or Call Us and Order Today!

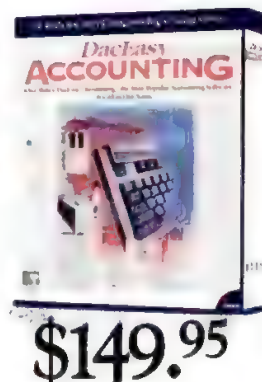
1-800-DAC-EASY

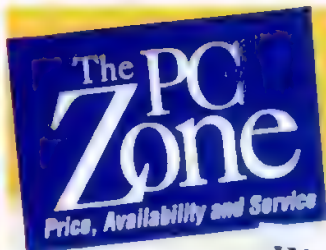
30-Day Money-back Guarantee when ordered directly from DacEasy.

Media Code: PCM

Requires: 10MB IBM or compatible or PC based Point of Sale system. Hard disk: DOS 5.1 or later; mouse optional. Network versions require NetBIOS compatible LAN. DacEasy, DacEasy Accounting and Point of Sale are trademarks of DacEasy, Inc. Copyright © 1992. All Rights reserved.

CIRCLE 022 ON READER SERVICE CARD





At the PC Zone, we provide you with more than just great prices and the widest selection available—we have the service and support to earn your continued business.

Se Habla Español

Our commitment:

- Knowledgeable sales advisors
- Personalized service
- Hassle-free ordering
- \$6 overnight shipping
- Canadian customers' orders, in most cases, delivered in 24 hours

Word Perfect for Windows Version 5.1

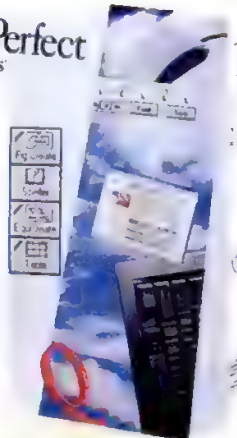
\$278

What's new in WordPerfect for Windows—a bunch! There's a new graphic interface, new WYSIWYG and graphics, mouse-driven object sizing and moving. Dialog boxes (similar to those in Lotus 1-2-3/G) make operation a breeze. WordPerfect • #09349 for 5.25" disks • #09740 for 3.5" disks

Companion Book:

WordPerfect for Windows: QuickStart The Step-By-Step Approach Que #07637..... **\$17**

WordPerfect for Windows



Creative Labs Multimedia Upgrade Kit Internal \$598

The Creative Labs Kit includes: an internal model SCD-521 CD-ROM drive, Sound Blaster Pro, MIDI adaptor and 5 CD titles: Microsoft® Windows™, Microsoft Bookshelf®, Creative SOUNDS/Prosonus, Sherlock Holmes, The Selectware System. Creative Lab #07698

Place your order through **CompuServe** Just Type: **Go MZ**

NORTON DESKTOP FOR WINDOWS

The Complete File Management and Utilities Solution for Every Windows User

NEW VERSION

Norton Desktop for Windows Version 2.0

\$98

Norton Desktop for Windows includes tape backup, anti-virus scanning and correction, a Windows text editor, additional file viewers, a comprehensive batch language with macro capability and more. Symantec • #07833 for 5.25" disks • #07834 for 3.5" disks



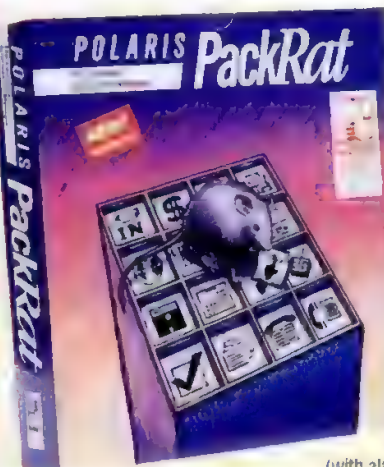
CA-SuperProject



CA-SuperProject 2.0 for Windows

\$564

With CA-SuperProject you can use a "what-if" analysis to get back on target by altering priorities, changing resource mixes, adding overtime or performing other project management procedures. CA-SuperProject helps you determine where you are ahead, where you are behind and what is needed to get back on schedule. Computer Associates #07576



PackRat 4.0 for Windows

\$254

Are you caught in an information maze? Get organized with PackRat 4.0. The PackRat modules include an incredible array of features: a phone log, a phone book, an index card file, a day schedule (with alarms), a financial account facility, a project manager, a disk file facility and more. Polaris #07008



- All major credit cards accepted. No surcharge
- Credit card is not charged until your order is shipped. If we must ship a partial order, freight is not charged on back order (USA only)
- Most personal and company checks received by mail will clear immediately. In order to be processed all checks or purchase orders must have a phone number and contact person listed
- C.O.D. orders are accepted. Limit \$1,000 per order. Cashier's check or money order only. Add \$5.00 per C.O.D. order
- Educational, government and corporate purchase orders are accepted
- All U.S. shipments insured at no extra charge
- No sales tax, except for Washington State residents (add 8.2%)
- Prices and product availability subject to change without notice. All specials and promotions are limited to available stock. Please call for current prices
- All products covered by 120 day limited warranty
- Shipping is \$6 per order for delivery in the USA. We ship via Airborne Express Overnight service. (Some rural areas require an extra day for delivery). We also ship \$3 UPS ground
- Orders placed 9pm to 7am ET are shipped free in USA via Airborne Express except monitors
- Orders placed by 9pm ET (6pm PT) weekdays for "in stock" items will ship that day for overnight delivery (barring system failure, etc.)
- APD/PFO box orders are shipped first class U.S. Mail. Shipments to P.O. Boxes are via UPS
- We will not be held responsible for typographical errors
- Defective software will be replaced immediately. Hardware will be repaired or replaced at our discretion
- A Return Authorization Number must be obtained prior to returning any item. Please call Customer Service Hotline, 1-800-248-9948, weekdays from 8am to 8pm PT, 9am to 8pm ET.

PC Zone 18005 NE 68th St, Suite A110 • Redmond, WA 98052-9904

International: 206-883-3088 • FAX: 206-881-3421

Call Now for your FREE Spring Catalog Over 2000 Products at Super Low Prices



New! Microsoft Windows Version 3.1 makes your PC easier to use. What's new in version 3.1? Plenty. For starters there's an improved Setup which automatically loads Windows onto your system and maintains your current configuration. New 3.1 prints faster too, and it uses TrueType font technology so your output will look better than ever. The powerful, more dependable operating system offers better support for MS-DOS-based applications, so you can easily copy and paste information between applications for MS-DOS or Windows. And the new Windows 3.1 provides an improved File Manager with enhanced Drag and Drop capabilities.



MICROSOFT WINDOWS

"It's faster and friendlier, should crash fewer DOS programs, and is smarter about managing memory."
Robert Luhn
PC World Magazine February 1992



Microsoft WINDOWS
Operating System, Version 3.1

Microsoft Windows Upgrade to 3.1

\$49

New Microsoft Windows 3.1 makes your PC easier to use. Discover the point-and-click simplicity of Windows! Create terrific output and share information between your favorite applications for MS-DOS and Windows. Upgrade from Microsoft Windows 2.x, 3.0 and receive the new Windows 3.1 at this special upgrade price! Microsoft #07749 for 5.25" disks • #7760 for 3.5" disks

Microsoft Windows 3.1

• #07751 for 5.25" disks • #07752 for 3.5" disks **\$89**

Microsoft Publisher
Designed to focus on the everyday needs of individuals and growing business, Microsoft Publisher produces professional-looking results every time you use it. Microsoft Corp. #09760

Microsoft Works
Microsoft Works seamlessly integrates five of the most-needed office applications: spreadsheet, database, word processor, desktop publishing and terminal software. Microsoft Corp. #09763

Microsoft Money
Microsoft Money helps you take control of your finances. Use it to write checks, set budgets, track expenses, or plan your financial future. Microsoft Corp. #09761

Microsoft Publisher \$138 for Windows

Designed to focus on the everyday needs of individuals and growing business, Microsoft Publisher produces professional-looking results every time you use it. Microsoft Corp. #09760

Microsoft Works \$128 for Windows

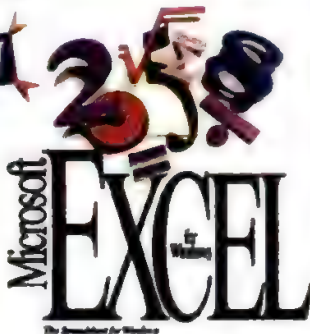
Microsoft Works seamlessly integrates five of the most-needed office applications: spreadsheet, database, word processor, desktop publishing and terminal software. Microsoft Corp. #09763

Microsoft Excel 4.0
Competitive Upgrade

\$118

NEW

The leading spreadsheet for the Windows environment just got even better. It gives you access to more powerful features and makes everyday spreadsheet tasks easier than you ever dreamed. Now, for a limited time, you can upgrade from a qualifying competitive spreadsheet to Excel 4.0 at this special price. Microsoft Corp. • #07892 for 5.25" disks • #07893 for 3.5" disks



Microsoft Excel 4.0 #07757 \$288

Microsoft Windows 3.1/Excel 4.0 Upgrade Bundle

• #07753 for 5.25" disks. • #07754 for 3.5" disks **\$188**

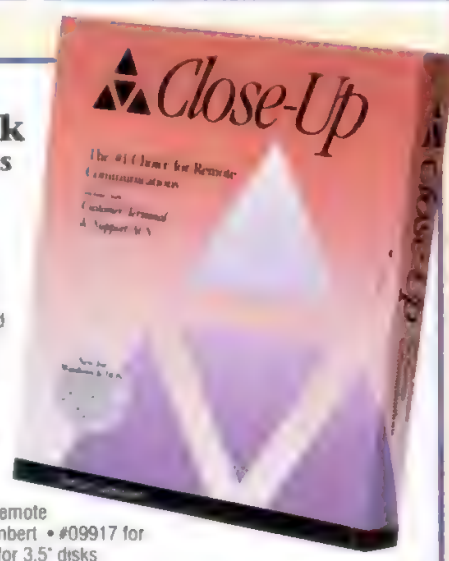
Microsoft Excel 4.0 Upgrade

• #07755 for 5.25" disks. • #07756 for 3.5" disks **\$89**

Close-Up Dual Pack for Windows & DOS

\$129

Now you can view and operate Windows and DOS applications on PCs which are miles away! Norton-Lambert's new Close-Up Dual Pack supports all modes of Windows and facilitates super-fast remote operation. Norton Lambert • #09917 for 5.25" disks • #09918 for 3.5" disks



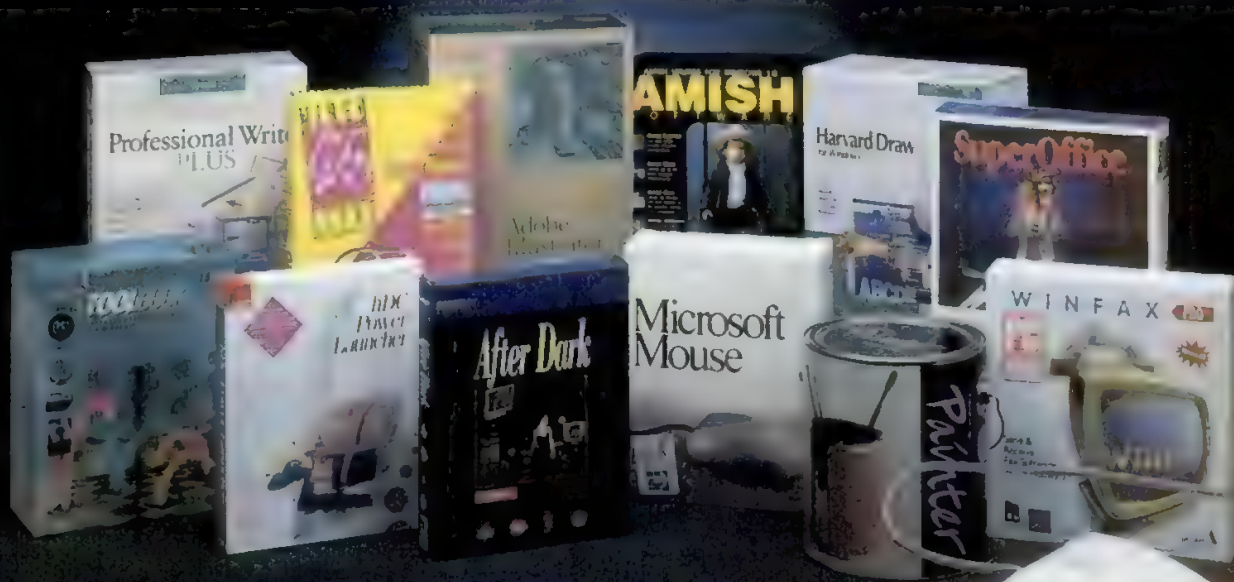
hDC FileApps
FREE! While supplies last \$129.95 VALUE Ask for it when you order #07751 or #07752

FREE with your purchase of Microsoft Windows 3.1

OVERNIGHT SHIPPING • 1-800-258-8088 • \$6 PER ORDER IN U.S.A.

Windows of Opportunity

File Edit View Insert Format Tools Tables Window Help



File Edit View Insert Format Tools Tables Window Help

Microsoft Mouse.....\$86

Microsoft Mouse

The World's most popular mouse! The Microsoft Mouse features 400-point-per-inch resolution, award winning design, guaranteed PC compatibility. No matter what application you work with, the Mouse can enhance your business productivity in ways you never imagined. Microsoft #08620

After Dark 2.0\$28

You asked for it, and we've got it. After Dark continues to be one of our most popular screen saver programs. It contains over 35 displays to both entertain and protect your valuable screen from phosphor burn. Berkeley Systems #07787

Professional Write Plus.....\$168

Professional Write PLUS from Software Publishing Corporation is the Windows word processor for the business professional who needs to produce high-quality work, but doesn't have the time to learn complicated software.

FREE IMSI MOUSE
With Professional Write Plus

Now, for a limited time, get a IMSI Mouse FREE when you purchase Professional Write Plus. Software Publishing Company #07835

Winfax Pro 2.0....\$74

Tired of running to the fax machine every time you send/receive a fax? With WinFax Pro you can fax documents (and receive faxes) directly from your computer, just click on the item you wish to send. Delrina Technology #09577

Illustrator 4.0 bundle with Streamline..\$394

NEW Adobe Illustrator 4.0 offers a complete professional illustration solution for the PC environment. The package includes Streamline, a powerful design utility which converts bitmapped images into high-quality PostScript artwork, in seconds. Also comes with a generous selection of Adobe patterns, textures, symbols and borders. Adobe Systems #7764

Fractal Design Painter\$278

Fractal Design Painter™ for Windows lets your PC create original art or embellish scanned images with realistic natural media effects by duplicating traditional tools and textures in 24-bit color. Fractal Design #07475

Harvard Draw...\$398

When you need to create spectacular, professional-quality illustrations Harvard Draw lets you do it quickly. Whether you're a business person at a computer or a professional illustrator at an artboard, with Harvard Draw you'll be productive in no time. Software Publishing Comp #07512-5.25" disk #07513-3.5" disk

hDC Power Launcher\$64

The hDC Power Launcher is the ultimate application launcher and manager. The enhanced Command line lets you create powerful commands that launch multiple applications. You can attach Enhance Commands to a system menu, or map them to input devices. hDC #07492

Wired for Sound Pro.....\$23

For a limited time get Wired For Sound for just \$23 when you purchase any Sound Blaster or compatible audio board or Windows 3.1. Wired For Sound Pro is the first commercially-available program that allows users to record and play sounds in Microsoft Windows 3.0 and 3.1. Aristosoft #07744

Amish Utilities Award Winner.....\$54

This windows-compatible utilities program increases your productivity with 6 helpful functions: a program launcher, a file accessor, a directory management tool, a memopad, a clock and a disk resources utility. Amish Software #07710

Toolbook 1.5....\$288

ToolBook is a software construction set you can use to build custom applications for Microsoft Windows 3.0 more quickly and easily than with conventional programming languages. Asymetrix Corporation #8208

SuperOffice.....\$224

This integrated, single-or multi-user database system helps employees at every level manage their work load more efficiently by putting 5 major functions at their fingertips: diary, activities follow-up, customer database, letter templates and reports. SuperOffice #07420

The PC Zone

1-800-258-8088

OPEN 24 HOURS EVERY DAY
CALL FOR FREE CATALOG!

Increase Your Productivity With Windows!

File Edit View Insert Format Tools Tables Window Help



File Edit View Insert Format Tools Tables Window Help

Perform Pro Designer & Filler\$188

Design, fill-in and maintain customized electronic business forms with Perform PRO. With the power of Windows 3.0 behind it, Perform PRO meets your "high end" form design and data management requirements. Delrina Technology #07127

dBFast\$348

A complete stand-alone dBase development language for Microsoft Windows. That's what you get with dBFast. With dBFast you can begin creating your Windows applications now! Computer Associates #07178

Harvard Graphics.....\$358

Never has there been a more elegant solution for creating dynamic business presentations. Harvard Graphics has been built to unleash the power of the Windows 3.0 and 3.1 environment and make your presentations come alive. Software Publishing Company #07480-3.5" disk #07479-5.25" disk

Visual Basic Competitive Upgrade.....\$98

Microsoft VisualBasic, the critically acclaimed programming solution for Windows, is now available at an incredible upgrade price. Call our knowledgeable sales advisors for complete details. Microsoft Corp. #07759

Gallery Effects.....\$128

Named among *How* magazine's "Best Electronics of 1991," Aldus Gallery Effects is a library of artistic effects that will automatically transform scanned photographs and other bitmap images into dramatic painting-like artwork. Aldus #07746-5.25" disk #07770-3.5" disk

TypeReader\$664

TypeReader eliminates the costly and time consuming process of re-typing! With TypeReader OCR software and your scanner, you can quickly, easily and accurately convert the printed page into electronic format. ExperVision #07718-5.25" disk #7719-3.5" disk

Norton Desktop 2.0.....\$98

The Norton Desktop for Windows is a complete Windows file management and utilities solution. It uniquely integrates the intuitive Windows 3.0 File Manager and Program Manager into one seamless desktop. Symantec #07833-5.25" disk #07834-3.5" disk

Executive 1.2.....\$58

Make your job easier with Finalsoft Executive. This state-of-the-art Microsoft windows-based personal and group information management software includes five modules: HyperText Editor, Group Scheduler, E-Mail, Multi-user database and Integrated Desktop Tools. Finalsoft #07761-5.25" disk #07760-3.5" disk

Carbon Copy\$118

Carbon Copy for Windows can significantly expand where and how you use your PC. With it you can control the programs, files and attached peripherals installed on your office PC from your home computer. The two PCs communicate via modems or can be directly connected using a null-modem cable. Microcom #07731

Superbase 4 V.1.3.....\$462

Now you can improve productivity and enhance your presentation quality. SuperBase 4, the only relational database for Windows, makes intelligent use of standard Windows elements. Software Publishing Company #09706

AmiPro 2.0.....\$299

It's one of the most fully-featured word processors available today. Included are all the tools you need to communicate your ideas clearly and effectively—outlining, tables, drawing, equations, a full macro language and more—all right at your fingertips. Lotus #09557

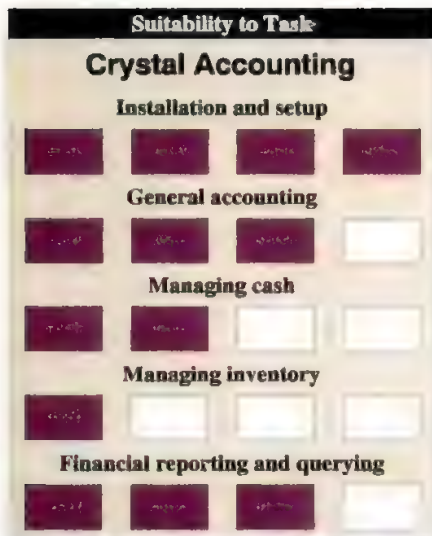
Icon Pak II\$65

Brighten up your desktop with colorful icons. With Icon Pak II, the comprehensive Icon Library for Windows, you can replace those dreary-gray DOS icons with over 400 dazzling custom color icons from Icon Pak II. Software Workshop #09556

OPEN 24 HOURS EVERY DAY
CALL FOR FREE CATALOG!

1-800-258-8088

The PC Zone
Price, Availability and Service



and these can be included on financial reports. A helpful control feature is *Crystal*'s ability to force printing of journals and a G/L listing prior to closing a period. *Crystal*'s Payroll module generates W-2 forms, federal 940/941 forms, and earnings reports.

Crystal's Financial Report Writer is flexible, but you should expect to spend some time using it before becoming proficient. As a starting point, you'll also want to rely on the sample report that Peachtree Software has provided for the test company.

PAYABLES POWER

Crystal's A/P module will support most small businesses quite well. The A/P allows you to capture separate terms for each invoice and will track the Aged Payables report by payment due date or discount date. It also prints 1099 forms. The package provides identical functionality to those selecting accrual or cash-basis accounting; in the latter case, it doesn't update the G/L until disbursement checks are produced or cash receipts are entered.

The A/R module has the same look and feel as the A/P. You can set up standard terms and discounts in the A/R master file yet override them on a customer-by-customer or invoice-by-invoice basis. Finance charges can be assessed by customer, and *Crystal* gives you the option to add interest to those charges. Oddly, while you can establish a credit limit for each customer, *Crystal* doesn't warn you if you enter an invoice that exceeds this limit. Instead, the product prints a warning on the aging report, which, in most cases, is too little too late.

WAIT TILL NEXT TIME?

Peachtree has announced plans to release a new version of *Crystal*, to be called *Peachtree Accounting for Windows*, possibly by the time you read this. One of its biggest enhancements is that it will provide a full Inventory system—an improvement over the simple line-item file provided in the current version. The new Inventory will maintain quantities on hand, units of measure, default vendor, selling price, and minimum stocking level. Inventory items are costed at average.

Other expected enhancements include better support for Windows standards, notably full support of MDI and OLE. A new desktop publishing-style forms designer will allow you to create statement, check, and invoice forms. A bank reconciliation module is also new.

Despite its solid functionality and substantial track record, *Crystal Accounting* is showing its age. Enhancements expected in the upcoming facelift, though, may well carry this product to the top of its class.

FACT FILE

Crystal Accounting, Version 4.0

Peachtree Software, 1505 Pavilion Place, Norcross, GA 30093; 800-247-3224, 404-564-5888.

List Price: \$249.

Requires: 1MB RAM, DOS 3.1 or later, Microsoft Windows 3.0.

CIRCLE 478 ON READER SERVICE CARD



DacEasy Accounting, Version 4.2, from DacEasy, boasts a large, well-balanced feature set. For \$149.95, you receive General Ledger, Purchase Order, Accounts Payable, Accounts Receivable, Billing, Cash Management, Inventory, Report Generator, and Graphics modules—more than enough to automate businesses in most industries.

DacEasy's menu structure is a departure from the modular, task-oriented approach. Instead, menus are organized by function: File, Edit, Transactions, Jour-

nals, Post, Reports, and Periodic. Accounting traditionalists may find this method a bit confusing, but most should be able to adapt within minutes of using the program.

Setup is smooth and painless. After *DacEasy* loads, it prompts you for some basic information, such as company name, your business and equity type, and other items necessary to set up a chart of accounts. From that point on, you simply follow the procedures laid out in the manual and you're quickly up and running.

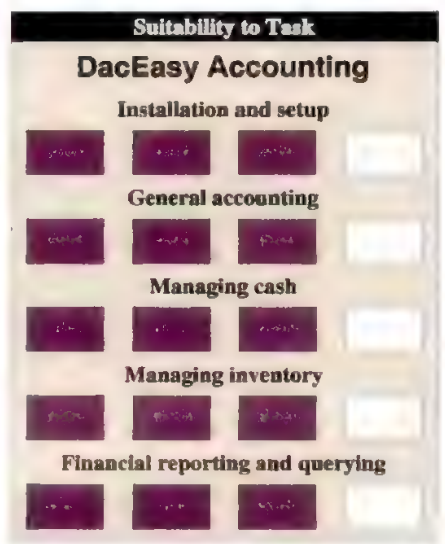
Although *DacEasy* does not provide sample data or an on-line tutorial, numerous support plans (including bulletin board support), instructional videos, and nationwide training seminars are available.

EASY ENTRY

DacEasy offers quick and efficient data entry. All master file records, such as account numbers, customers, and vendors, can be entered on the fly. Globally supported pop-up windows allow you to search all records either by name or by number. This is a real time-saver when you're working with unfamiliar numbers in a new chart of accounts.

One of *DacEasy*'s greatest strengths is its G/L reporting. One of several products tested that includes a financial Report Writer, *DacEasy* provides full control over sequencing of accounts and report columns. If you purchase *DacEasy*, plan on using the Report Writer since the predefined reports provided in the main program are very basic.

DacEasy fully supports recurring transactions for cash receipts, cash payments, and invoices. In the G/L, recurring journal



AWARD WINNING ACCOUNTING SYSTEMS FOR EVERY BUSINESS... SMALL AND LARGE

Access to Platinum

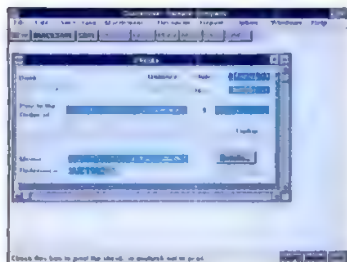


The Small Business Accounting Solution.

Designed with small businesses in mind, Access to Platinum™ is an "all-in-one" accounting program. From entering invoices to generating mailing lists, Access to Platinum simplifies all the processes necessary to run an efficient accounting system. You won't find an accounting program that's easier to learn, or easier to use.

First True Windows Accounting Program. Access to Platinum is not merely Windows™ compatible: it's Windows proficient. You can open several forms onscreen at the same time, and move back and forth between them. It is the only double-entry accounting program that truly exploits the graphical features that make Windows so easy to use. Access features:

- "What You See Is What You Get" (WYSIWYG) screens
- Comprehensive on-line tutorials
- Graphical User Interface (GUI)
- Task-oriented user manuals
- Accounting primer



Data entry forms, such as this WYSIWYG check, look just like their paper counterparts.

Access to Platinum Modules.

- General Ledger
- Accounts Payable
- Accounts Receivable
- Checkbook
- Inventory
- Job Costing and Time/Billing
- Payroll

Platinum



The Powerful, High-end Accounting Solution.

Platinum® is the one accounting software program for your many business needs. It offers the capabilities of a complete management information system (MIS) with the power to handle all your accounting and information management needs.

More than just a basic bookkeeping program, Platinum:

- Consists of twenty wholly integrated accounting software modules for virtually every type of business
- Provides a complete set of accounting functions
- Tracks information effectively, keeping all transaction records online indefinitely
- Provides complete MIS features for reporting and analyzing the comprehensive records it keeps
- Offers almost unlimited reporting capabilities
- Grows with your expanding needs by letting you operate most modules on a stand-alone basis
- Offers outstanding performance, even on large local area networks

International Accounting. Platinum Version 3.0 is the first major microcomputer accounting package to provide comprehensive support for companies that process business transactions in multiple currencies or that market their products or services internationally. If you have foreign suppliers or customers, then you'll appreciate the multinational capabilities that Platinum delivers:

- Processing in unlimited foreign currencies
- Tracking exchange rate gains and losses
- Processing under varied tax structures
- Processing in multiple languages
- Support for international numeric, date and address formats

Competitive Upgrade \$79.95
With proof of purchase, you can upgrade from any other accounting system to Access to Platinum for only \$79.95 for the Windows version (\$49.95 for the DOS version) over 67% off the suggested retail price of \$249.95.

Free Demo Diskette!
Call 800-999-2336
or FAX 714-753-9731

Platinum Upgrade
Upgrade from select competitors' accounting systems to the power of Platinum.

Call Platinum's Product Information Center for details.
800-426-0469

Access to Business Power. With Access to Platinum, you don't have to worry about posting or other complicated procedures. You always have instant access to the financial status of your business.

Upgrade to Platinum. Access to Platinum is also available for DOS, with soon to be released network versions for DOS and Windows. You can easily upgrade from DOS to Windows or to a network version. As your company grows, you can upgrade to the powerful, award-winning Platinum accounting system.

Attention Accountants!

Call for information on specially priced Platinum introductory packages for practicing accountants



PLATINUM®
HOLDINGS CORPORATION

15615 Alton Parkway, Suite 300 Irvine, CA 92718
(714)727-1250 • FAX (714)727-1255

CIRCLE 327 ON READER SERVICE CARD

© Copyright 1992 Platinum Holdings Corporation. All rights reserved.
Platinum is a registered trademark of Advanced Business Microsystems, Inc.
Access to Platinum is a trademark of Platinum Computer Software, Inc.
Windows is a trademark of Microsoft Corporation.
All other trademarks acknowledged.

CONSUMABLES THAT WON'T CONSUME YOUR BUDGET

by Lance Ulanoff

Products associated with consumables—razors and their blades, printers and their toner, and accounting programs and their business forms—all deliver the same bad news: Eventually, you pay more for supplies than you did for the original product. To utilize fully any of the software packages reviewed here (with one exception), you need the proper business forms.

Part of the popular wisdom surrounding low-cost accounting software is that vendors sell you the software cheaply and then get the money back on the cost of the forms they sell to you. The ominous (usually unspoken) implication is that they overcharge for forms. To investigate this dark rumor and to get an overview of the forms question in general, *PC Magazine* conducted a study of the forms market and some alternatives to commercially preprinted accounting forms.

In our study, we talked to the five low-cost accounting software market leaders—M-USA Business Systems (*Pacioli 2000*), Great American Software (*One-Write Plus Accounting Works*), DacEasy (*DacEasy Accounting*), Intuit (*Quicken, QuickBooks*), and Peachtree Software (*Peachtree Complete III*)—and to independent forms suppliers. For consistent comparison, we priced checks, multipurpose forms (used for invoices, purchase orders, and the like), and monthly statements in quantities of 500 and 1,000.

Among the software vendors we spoke to, more than half do sell forms directly to customers. And while we learned that some of these companies do indeed depend heavily on such after-market sales for their revenue stream (M-USA is an example), we also learned that you'll probably pay about the same prices whether you buy from them or go to an outside forms vendor.

"The forms we sell are specifically designed for our packages," says M-USA CEO José Hurtado. "However, you can only copyright the look of a form, not the placement of the figures. So customers can buy compatible forms

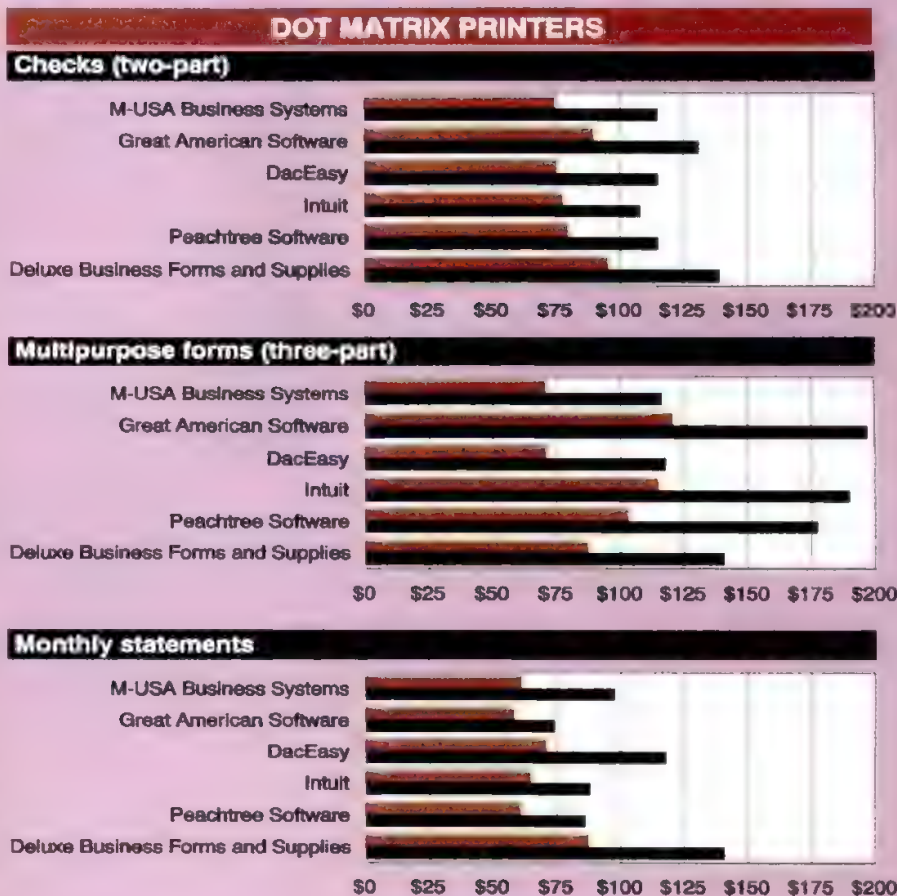
from other vendors, but they're not getting better prices." The truth of this statement was borne out by our subsequent conversations with independent suppliers.

DIFFERENT STROKES . . .

Inside a typical accounting package, you'll find a catalog or brochure (often with samples included) detailing forms selection and prices. You are generally offered a choice between dot matrix-type (fanfold, tractor-fed, and frequently multipart) and laser printer-type in a range of styles, often with discounts for volume buying.

Laser printers can print only one sheet at a time, so single-sheet laser forms tend to be less expensive than their multipart dot matrix counterparts. But many businesses need multiple copies of their forms (which they can get in the dot matrix version). M-USA addresses this issue by offering its laser forms in collated sets of three different-colored sheets, just like multipart forms. *Pacioli 2000* is programmed to print these forms in sets of three.

According to Hurtado, this three-sheet form actually saves money "because you don't have to photocopy the sheet, which can be more expensive



The charts on these two pages compare business-form pricing from five leading accounting-software vendors and from Deluxe Business Forms and Supplies, the leading independent forms supplier. We priced commonly used preprinted forms designed for both dot matrix and laser printers. The red bars represent quantities of 500 forms; the black bars represent quantities of 1,000.

than buying the forms. Businesspeople often don't realize this because the copy paper has already been paid for."

PLAYING IT BOTH WAYS

Few software vendors actually print their own forms, of course, and some, like Peachtree, simply endorse other companies that produce and sell them. When you order forms from Peachtree Forms (800-553-6485), you're really calling Miami Systems in Cincinnati. It sells and ships Peachtree's forms direct. This is a faster and cheaper way, according to Mike McBrayer, Peachtree's production services manager.

Great American, among other companies, licenses Deluxe Business Forms and Supplies (800-328-0304), the leading independent forms supplier, to produce and sell its forms. But Deluxe isn't Great American's only channel to mar-

ket. It also licenses distribution network marketer Safeguard Business Systems in Fort Washington, Pennsylvania (215-641-5000), to sell its *One-Write Plus Accounting* software and to produce and sell the associated forms. In fact, while customers who buy *One-Write* from Egghead Software will find a Deluxe brochure inside, those purchasing the same software from Safeguard will find one of that distributor's own brochures. Why two forms outlets? Great American says the Safeguard shops provide something Deluxe can't:

face-to-face service. Great American receives royalty fees from both forms vendors.

Software-based forms design is available to those whose accounting software lacks this feature.

FORMS BY DESIGN

Ultimately, preprinted forms may go the way of the Edsel. One of the packages we review here (*M.Y.O.B.*) includes a forms designer module that lets you laser print checks, invoices, and state-

ments on plain paper. Further, you can customize these forms to your own designs and add logos or other graphics. This seems likely to be the harbinger of a trend.

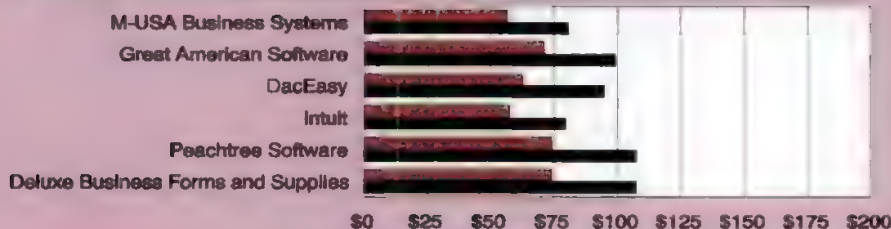
Indeed, software-based forms design is already available to those whose accounting software lacks this feature. For \$149.95, Manzanita Software (800-447-5700) markets *BusinessForms*, an accounting-specific forms package that works with *Pacioli 2000*, *Peachtree Complete III*, *DacEasy Accounting*, and Manzanita's own *BusinessWorks*. And a number of general-purpose forms packages can handle accounting and countless other forms needs. Delrina Technology's \$249 *Perform Pro*, for example, includes a number of accounting-form templates in the package, which can be easily modified.

Benefits of this approach are measured in both convenience and cost. According to Delrina, many preprinted forms end up in the wastebasket when the company changes its address or logo. Forms software, which can create "forms on demand," eliminates this problem. And forms printed on plain paper cost less than half as much as preprinted forms, even when paper and toner costs are factored in.

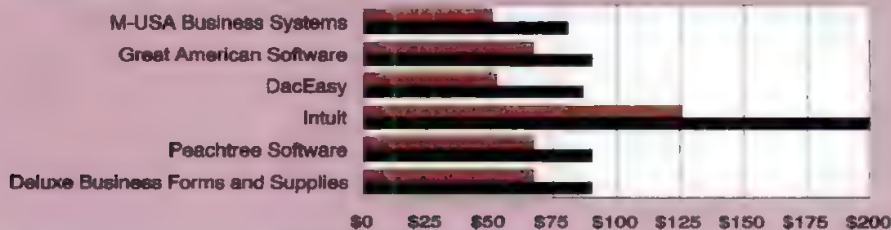
As Windows continues to mature, and as low-end accounting packages incorporate better Windows integration, the electronic form may prevail. ■

LASER PRINTERS

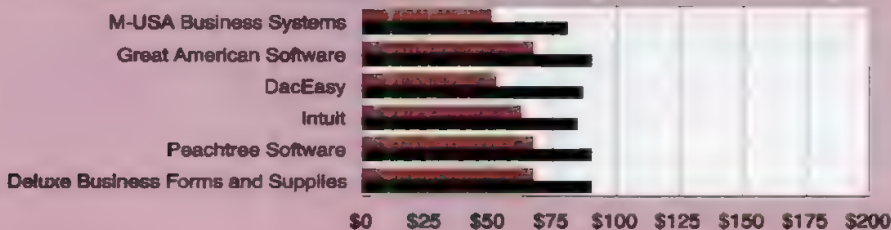
Checks (one-part)



Multipurpose forms (one- to three-part)



Monthly statements



entries can be made for a fixed amount or by percentage of an account balance and can be tracked by the number of times generated, or even programmed to stop on a certain date. *DacEasy* posts transactions from its other modules to the G/L in summary (totals only, no details). Of course, this is standard procedure for larger businesses—the reason that journals were invented—but the needs of smaller businesses are better served by full transaction detail at the G/L level.

BUY, RECEIVE, OR BILL

DacEasy's Purchasing module is tightly integrated with the A/P and Inventory modules. Purchase orders are easily transformed into vouchers, and the Inventory module is updated for items received and product cost. A separate purchase code function allows you to issue purchase orders for items that cannot be inventoried.

Entering data into the A/P voucher screen requires a knowledge of double-entry accounting. The screen structure gives the appearance of a G/L journal entry. *DacEasy* also provides for establishing vendors on either a cash or an accrual basis.

The Receivables and Billing modules work with service or product items, track customer backorders, manage multiple pricing levels and quantity discounts, and allow for departmentalization of sales and costs by customer group or product type.

DacEasy calculates sales tax (though only for one tax jurisdiction) and captures the salesperson information for each invoice. Oddly, it does not provide a standard sales tax or salesperson report. To report on this information, you'll have to create a custom report using the Report Writer.

TRAILING THE NUMBERS

While *DacEasy* has strong accounting-control and audit-trail abilities, some users may find that it enforces them too rigidly. For example, after you've entered materials receipts in Purchasing, before you print the journal and post the transaction, you must print a materials receipt form.

While this control may be appropriate for some small businesses, most wouldn't bother with the print-form stage. For such companies, *DacEasy* has added an unnecessary step.

The Inventory module can track limited component assembly and disassembly. Three inventory methods are supported: average cost, standard cost, and last purchase price. Sales prices can automatically be updated by a percent of cost.

The *DacEasy* package also includes a graphics option that prints charts and graphs of account balances and activity in nine different formats. *DacEasy Payroll* is available for \$99.95 but you can buy it bundled with *DacEasy Accounting* for a package price of \$199.95. A five-user network version of *DacEasy* is also available for \$299.95.

If you have some accounting background and don't mind posting transactions every step of the way, *DacEasy* presents a good balance of functionality, usability, and value.

FACT FILE

DacEasy Accounting, Version 4.2

DacEasy Inc., 17950 Preston Rd., #800, Dallas, TX 75252; 800-322-3279, 214-250-0205.

List Price: \$149.95; Bonus Pack (with *DacEasy Payroll*), \$199.95.

Requires: 640K RAM, DOS 3.1 or later.

CIRCLE 479 ON READER SERVICE CARD

General Business System

by Raymond A. August

CYMA Systems' *General Business System* (\$295 for the LAN or standalone version), although strong on features, is a throwback to the early days of PC-based accounting systems—the days of data

Suitability to Task

General Business System

Installation and setup



General accounting



Managing cash



Managing inventory



Financial reporting and querying



fields without pop-up windows, when master file records couldn't be added on the fly and multilevel menus and on-line help were just a dream.

General Business System (GBS's) General Ledger module uses an eight-digit departmental account number and supports multicompany processing. One of *GBS's* biggest problems, however, stems from the complete autonomy of the G/L from all the other modules: Account numbers are validated only at the time of posting, which could result in inefficient, time-consuming month-end closings.

The Inventory module supports five different valuation methods, user-defined inventory part numbers, backorder capability, and three prices per inventory item. Reporting is strong, particularly in the areas of sales analysis, inventory valuation, and reorder management.

Along with Payroll and Job Control modules, *GBS* has a useful Autopilot feature that allows the creation of keystroke macros to automate routine tasks such as month-end processing and printing of reports. *GBS's* ability to print and track pages for payment books (for example, a car loan payment book) could also prove useful.

An impressive optional financial statement, Report Writer, is available for \$195. While it almost doubles the price of the package, its abilities are crucial, since *GBS* doesn't come with any standard financial statements.

If you're not ready to move up to the next strata of low-end accounting software or if you'd rather do things like Smith-Barney ("the old-fashion way"), then CYMA's *General Business System* may be for you. Otherwise, you might

want to search for a more contemporary answer.

FACT FILE

General Business System

CYMA Systems Inc., 1400 East Southern Ave., Tempe, AZ 85282; 800-292-2962, 602-831-2607.

List Price: \$295.

Requires: 256K RAM, DOS 3.0 or later.

CIRCLE 480 ON READER SERVICE CARD

Manage: Complete

by Raymond A. August

If you're searching for a software package capable not only of addressing your accounting needs but of supporting other areas of your business as well, take a look at *Manage: Complete* from Management Information Software. For a thrifty \$149.95 (\$299.95 for the network version), *Manage: Level 1* delivers an abundance of accounting modules—General Ledger, Accounts Payable, Accounts Receivable, Report Writer, Purchasing, Inventory, Order Entry, and Payroll. For a total price of \$299.95 (\$499.95 network), *Manage: Complete* adds some additional useful capabilities: Contact Management, Requisitioning, Point of Sale, and Personnel Management.

Initial setup is straightforward, since *Manage: Complete* proactively guides you through the installation process. The package provides predefined charts of accounts structured along industry lines, such as service, manufacturing, professional, and retail. Pull-down menus and well-designed data entry screens provide for painless data input. On-the-fly updating of all master file records is provided, and *Manage: Complete* supports lookup windows for all data screens.

SOLID BASICS

The G/L module accommodates departmentalization better than any other product we reviewed. When you add a new account, *Manage: Complete* asks you if you want departments. If you answer yes, a window pops up during transaction entry, prompting you to enter the department to be charged.

Manage: Complete gives a new twist to searching for accounts. When you press

F2, the program presents a list of account categories such as revenues, expenses, and so on. Once you select a category, you see only a list of accounts within that category. (This two-level approach should be helpful to new users, but experienced users may find the extra keystrokes an irritation.)

All of *Manage: Complete*'s posting is on-line so your financial data is current at all times. If you want to monitor your financial position, the financial status screen, which is updated automatically, shows your company's sales, cost of sales, cash, Accounts Payable, and Accounts Receivable at that precise moment.

SLOW-PACED PACKAGE

Despite some excellent features, *Manage: Complete* is quite sluggish during data entry and when moving from screen to screen. This is surprising, since the package is written in *FoxPro*, which is known for its speed. Further, the on-line help feature could use some improvement. At times, it doesn't provide enough detail and information. Finally, *Manage: Complete* does not support either recurring entries or easy automatic reversal of G/L entries. While this is not terribly un-

usual, there is no reason for such an omission.

INVENTORY STORY

Manage: Complete's Inventory maintains as many as six price levels for each item, supports percentage discounts, and will

track serialized inventory. As one of the few packages that tracks serialized inventory, *Manage: Complete* is a prime contender for businesses that need to maintain the serial numbers of the items sold. The Inventory module also allows two methods of inventory costing: average cost and standard cost.

The Purchasing module has several

features that help keep data entry to a minimum. For example, purchase orders can be automatically converted into Accounts Payable invoices. However, check printing poses a significant control risk, since checks can be reprinted over and over without an audit trail. This glitch will require special vigilance.

Manage: Complete's Order Entry module is highly capable. It easily produces quotes for either products or services. Percentage discounts can be given by line item, and unlimited sales taxes can be charged. The module also prints a variety of reports, including COD labels, picking lists, price lists, and sales tax.

ADDED VALUE, ADDED COST

The fully integrated Point of Sale module is ideal for small retail businesses. Supporting both a cash drawer and a bar-code reader, it can help monitor in-store selling. At the end of the day, the cash out feature helps calculate cash drawer over/under, posts the difference to the G/L, and then assists with the preparation of the deposit slip for the bank.

The Contact Manager allows you to document correspondence with vendors, customers, and employees. For example, this module can be used to track and accumulate information regarding employee performance reviews, or track conversations and activities with a particular customer or vendor. Having this

SOFTWARE PRICE WATERHOUSE REPORT

*Manage: Complete's
Order Entry module is
highly capable. It easily
produces quotes for
either products or
services and prints a
variety of reports.*

Suitability to Task

Manage: Complete

Installation and setup



General accounting



Managing cash



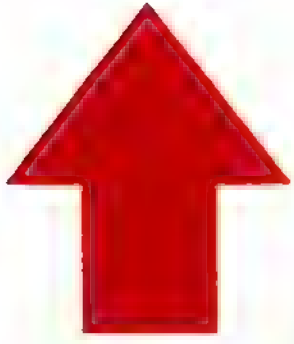
Managing inventory



Financial reporting and querying



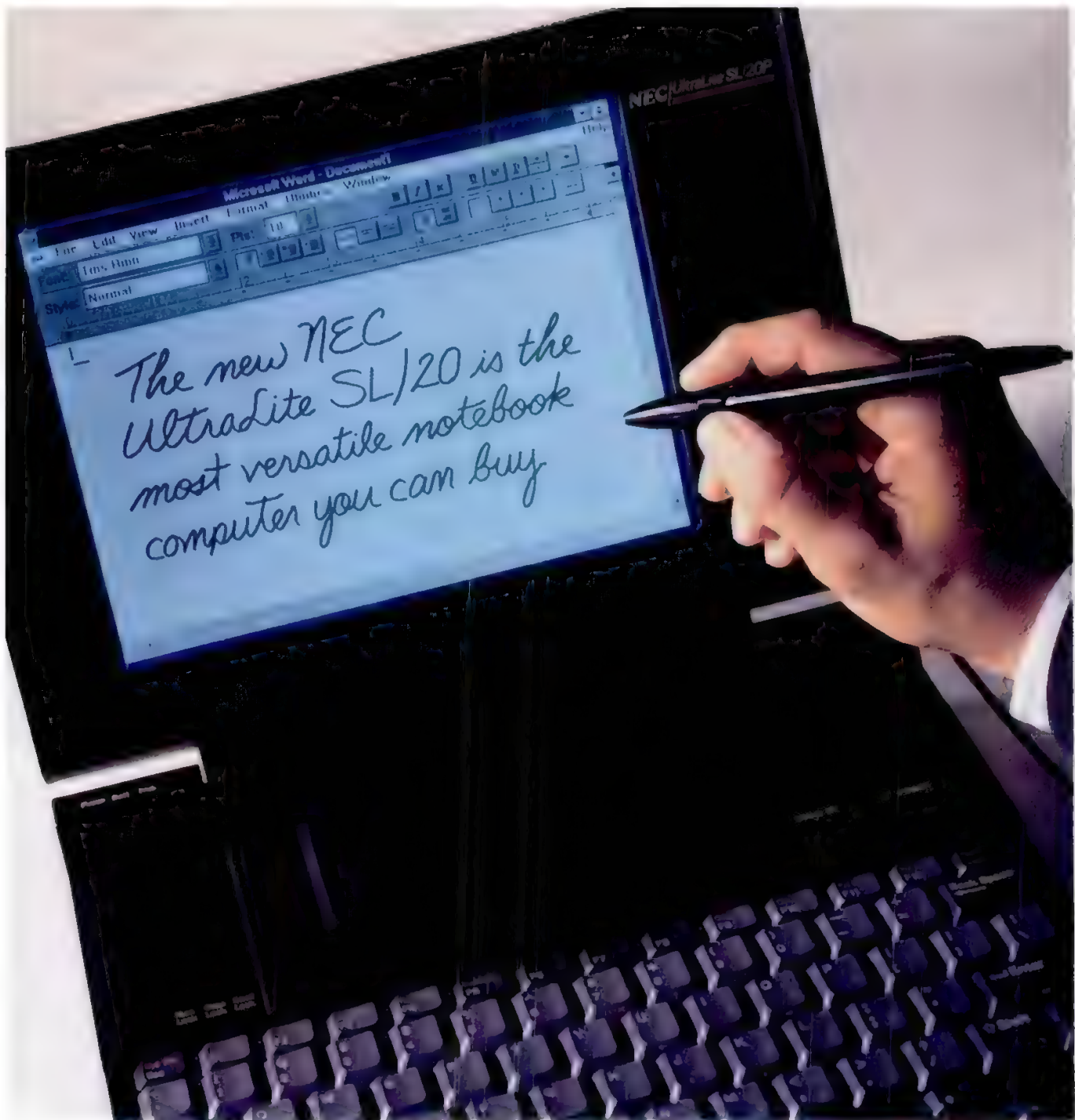
The new NEC UltraLite SL/20 is the most versatile notebook computer you can buy. And you can put that in writing.



The UltraLite SL/20 is just one of the many innovations NEC has brought to portable computing. Others include the first color laptop, the first portable Docking Station and the first 486SX laptop with 256 colors at 640 x 480 resolution.

Is the pen mightier than the keyboard? In the case of the new NEC UltraLite® SL/20, it's actually a tie. The SL/20 is driven by a powerful 386SL, 20MHz processor with 16KB cache, for enhanced performance. It has an 80MB or 120MB hard drive with factory-installed MS-DOS® and Windows®. And with 2MB of standard RAM (expandable to 8MB), it can handle your most demanding applications. It's extremely lightweight. It provides superior power management, giving you 3 to 7 hours of battery life. And it can serve as a desktop, thanks to an optional, full-function portable Docking Station™. And what does the future hold? A pen. Because soon the SL/20 will offer the option to upgrade to pen computing. So you can forget the mouse. And use your finger or pen to open a window or to access a file. You'll be able to work with NEC's standard UltraDraw™ software. So you can capture signatures. Annotate documents. Do sketches. Or create charts. And you'll be ready for Windows for Pen Computing™* with its handwriting recognition and on-screen editing capabilities. The UltraLite SL/20. It has versatility written all over it.

Call 1-800-NEC-INFO (in Canada, 1-800-343-4418), or NEC FastFacts at 1-800-366-0476, #ULSL20 (857520), for immediate literature.



Because  is the way you want to go.

NEC



SUMMARY OF FEATURES

Products listed in alphabetical order

☒ —Editors' Choice
☒ —Yes ☐ —No

	Access to Platinum	ACCPAC Simply Accounting for Windows	Act 1 Plus	Business-Vision II	Crystal Accounting	DacEasy Accounting	General Business System
List price	\$249.00	\$199.00	\$199.50	\$225.00	\$249.00	\$149.95	\$295.00
GENERAL FEATURES							
Interface	Microsoft Windows	Microsoft Windows	DOS	DOS	Microsoft Windows	DOS	DOS
Upgrade available	☒	☒	☒	☒	☒	☒	☒
Password security	☒	☒	☒	☒	☒	☒	☒
Network version available	☒	☐	☒	☒	☒	☒	☒
Context-sensitive help	☒	☒	☒	☐	☒	☒	☐
Mouse support	☒	☒	☐	☐	☒	☒	☐
Tutorial	☒	☐	☒	☒	☒	☐	☒
Number of sample account charts	8	6	20	1	4	1	1
Sample data	☒	☒	☒	☒	☒	☐	☒
Master file lookups	☒	☒	☒	☒	☒	☒	☐
Allows cash basis	☐	☐	☒	☒	☒	☒	☒
PERIOD PROCESSING							
Future period processing	☒	☐	☒	☒	☒	☒	☒
Compresses period detail	☐	☐	☒	☒	☐	☒	☒
Maximum number of open periods	Unlimited	1	15	Unlimited	1	18	User-definable
PRINTING							
Prints reports to screen	☒	☒	☒	☒	☒	☒	☒
Prints reports to file	☒	☒	☒	☒	☐	☒	☒
User-customizable forms:							
Statements	☒	☐	☒	☒	☐	☐	☐
Checks	☐	☐	☒	☒	☐	☐	☐
Invoices	☒	☐	☒	☒	☐	☐	☐
TECHNICAL SUPPORT							
Annual support fee	\$125	\$75	\$295	\$99	\$99 per hour	\$75	\$95-\$395
GENERAL LEDGER MODULE							
G/L program parameters:							
Account number structure (in alphanumeric characters)	20	4 (numeric only)	15	5	10	10	8 (numeric only)
Number of budgets per account	1	None	1	None	1	1	13
G/L features and functions:							
Automatic reversing entries	☐	☐	☒	☐	☐	☒	☐
Automatic recurring entries	☒	☐	☒	☐	☒	☒	☐
Automatically generates new account number combinations	☐	☐	☐	☐	☐	☐	☐
Allows entry of next year's budget during current year	☐	☐	☐	☐	☐	☐	☐
Predefined G/L reports:							
Balance sheet	☒	☒	☒	☒	☒	☒	☒
Income statement	☒	☒	☒	☒	☒	☒	☒
Cash-flow statements (FAS 95)	☐	☐	☐	☐	☒	☐	☐
Trial balance	☒	☒	☒	☒	☒	☒	☒
Chart of accounts	☒	☒	☒	☒	☒	☒	☒
Comparative-year financial statements	☐	☐	☒	☐	☐	☒	☒
Budget-vs.-actual financial statements	☒	☐	☒	☐	☐	☒	☒
G/L custom report writer	☐	☐	☒	☐	☒	☒	☒

SOFTWARE
PRICE WATERHOUSE REPORT

Manage: Complete	MYOB	One-Write Plus Accounting Works	Pacioli 2000	PC Accountant	pcMRP	Peachtree Complete III	Takin' Care of Business	Teknon Accounting
\$299.95	\$249.00	\$199.95	\$49.95	\$295.00	\$179.00	\$199.00	\$149.95	\$249.00
DOS	Microsoft Windows	DOS	DOS	DOS	DOS	DOS	DOS	DOS
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
4	4	14	1	1	1	2	1	13
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
Unlimited	13	15	36	2	12	1	Unlimited	26
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
\$299 (with upgrades)	\$79 (with annual upgrades)	\$125	\$75	\$1 per minute; free fax support (\$20 minimum)	\$85 per hour; first 20 minutes free	\$99	Free	\$115
10	5	4	10	7	4 (numeric only)	6 (numeric only)	6	2-8 (numeric only)
1	1	12	1	1	1	2	1	1
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐					

SUMMARY OF FEATURES

Products listed in alphabetical order

— Editors' Choice
☐ — Yes ☐ — No

Access to Platinum	ACCPAC Simply Accounting for Windows	Act 1 Plus	Business-Vision II	Crystal Accounting	DecEasy Accounting	General Business System
--------------------	--------------------------------------	------------	--------------------	--------------------	--------------------	-------------------------

ACCOUNTS PAYABLE MODULE

A/P program parameters:

Maximum number of bank accounts supported	Unlimited	1	1	Unlimited	Unlimited	Unlimited	1
Vendor-number structure (in alphanumeric characters)	8	35	15	6	8	10	4

Processing:

Checks history file for duplicate invoice number	☐	☒	☒	☐	☒	☐	☐
Permits user to add vendors on the fly	☒	☒	☒	☐	☒	☒	☐
Processes void checks	☒	☐	☒	☐	☐	☐	☒
Issues debit memos	☐	☐	☒	☒	☐	☒	☐
Allocates vouchers to multiple accounts	☒	☒	☒	☒	☒	☒	☒
Payment terms stored by vendor	☒	☐	☒	☒	☒	☒	☒
Permits one-time vendors	☐	☐	☒	☐	☒	☒	☐
Permits recurring vouchers	☒	☐	☒	☐	☐	☒	☒

Check processing:

Manual check processing	☒	☒	☒	☒	☒	☒	☒
-------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------

Allows payment selection by:

Vendor number and name	☒	☒	☒	☒	☒	☒	☒
Due date	☒	☐	☒	☐	☐	☐	☒
Discount date	☒	☐	☐	☐	☐	☐	☒
Reconciles checks against bank statement	☒	☐	☒	☒	☐	☒	☐
Lists outstanding checks	☒	☐	☒	☒	☐	☒	☐

A/P reports:

Check preview	☐	☐	☒	☐	☒	☒	☒
Check register	☒	☐	☒	☒	☒	☒	☒
Cash projection by due dates	☒	☐	☒	☒	☒	☒	☐
Prints 1099 forms	☐	☐	☒	☒	☒	☒	☐

ACCOUNTS RECEIVABLE MODULE

A/R program parameters:

Customer-number structure (in alphanumeric characters)	8	35	15	6	8	10	5
Number of ship-to locations per customer	1	None	1	1	None	Unlimited	None

A/R processing:

Checks customer credit limit	☒	☒	☒	☒	☐	☒	☒
Issues credit memos referenced to an invoice	☒	☐	☒	☒	☐	☒	☐
Permits payments on account	☐	☒	☒	☒	☒	☒	☒
Processes partial payments	☒	☒	☒	☒	☒	☒	☒
Applies cash receipts to multiple invoices	☒	☒	☒	☒	☒	☒	☒
Handles recurring billings	☒	☐	☒	☒	☐	☒	☒
Calculates discount terms per customer	☒	☐	☒	☒	☒	☒	☒
Calculates finance charges	☒	☒	☒	☒	☒	☒	☒
Adds customers on the fly	☒	☒	☒	☒	☒	☒	☐
Tracks salesperson at invoice level	☐	☐	☒	☒	☐	☒	☐

SOFTWARE
PRICE WATERHOUSE REPORT



Manage: Complete	M.Y.O.B.	One-Write Plus Accounting Works	Pacioli 2000	PC Accountant	pc/MRP	Peachtree Complete III	Takin' Care of Business	Teknon Accounting
Unlimited	Unlimited	15	Unlimited	Unlimited	Unlimited	9	Unlimited	20
15	31	8	10	9	5	6	6	6
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐ </					

SUMMARY OF FEATURES

Products listed in alphabetical order

—Editors' Choice

☒—Yes ☐—No

Access to Platinum **ACCPAC Simply Accounting for Windows** **Act 1 Plus** **Business-Vision II** **Crystal Accounting** **DacEasy Accounting** **General Business System**

ACCOUNTS RECEIVABLE MODULE (continued)

A/R reports:

Statements	☒	☐	☒	☒	☒	☒	☒
Aging report in detail	☐	☒	☒	☒	☒	☒	☒
Aging report in summary	☒	☒	☒	☒	☒	☒	☒
Dunning letters	☐	☐	☐	☐	☐	☐	☐
Customer mailing labels	☒	☒	☒	☒	☒	☒	☒
Sales by salesperson	☐	☐	☒	☒	☐	☒	☐

ORDER ENTRY MODULE

Automatic order numbers	☐	N/A	☒	☒	☐	☒	☐
Price quotes	☒	N/A	☐	☒	☐	☐	☐
Automatically commits inventory	☒	N/A	☒	☒	☐	☒	☒
Able to sell nonstocked inventory	☒	N/A	☒	☒	☒	☒	☐
Able to sell service items	☒	N/A	☒	☒	☒	☒	☐
Applies freight	☒	N/A	☒	☒	☐	☒	☒
Serial number and lot tracking	☐	N/A	☐	☒	☐	☐	☐

O/E reports:

Open orders	☒	N/A	☐	☒	☐	☐	☒
Back orders	☐	N/A	☒	☒	☐	☒	☒
Pick tickets	☐	N/A	☒	☒	☐	☐	☒

Sales tax report:

Jurisdiction	N/A	N/A	☒	☒	N/A	☒	☐
Gross sales	N/A	N/A	☒	☒	N/A	☐	☐
Amount due	N/A	N/A	☐	☒	N/A	☐	☐

INVENTORY MODULE

Inventory program parameters:

Inventory item-code structure (in alphanumeric characters)	8	7	15	14	N/A	14	30
Maximum number of warehouses	1	1	1	1	N/A	1	1,225

Data fields maintained:

Serial number	☐	☐	☐	☐	N/A	☐	☐
Quantity on hand	☒	☒	☒	☒	N/A	☒	☒
Quantity on order	☐	☐	☒	☒	N/A	☒	☒
Committed quantity	☐	☐	☒	☒	N/A	☒	☒

Inventory costing:

Average cost	☒	☐	☒	☐	N/A	☒	☒
Weighted average	☐	☒	☒	☒	N/A	☐	☒
Standard cost	☐	☐	☒	☐	N/A	☒	☒
LIFO (last in, first out)	☐	☐	☒	☐	N/A	☐	☒
FIFO (first in, first out)	☐	☐	☒	☐	N/A	☐	☒

Pricing:

Maximum number of price levels by item	1	1	5	5	N/A	3	3
Discount quantities by percentage	☒	☐	☒	☒	N/A	☒	☐

N/A—Not applicable: The product does not have this feature.

SOFTWARE
PRICE WATERHOUSE REPORT



Manage: Complete	M.Y.O.B.	One-Write Plus Accounting Works	Pacioli 2000	PC Accountant	pc/MRP	Peachtree Complete III	Takin' Care of Business	Teknon Accounting
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐						

A decade ago

1990 and 1991 World Class Awards
for Best Mail-Order Company



□ 3 1/2" format available from us. Specify when ordering.

□ package includes both 5 1/4" and 3 1/2" disks.
■ 3 1/2" format available from manufacturer by request. Call us for details.

CP—copy-protected; NCP—not copy-protected.

The four-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

SOFTWARE

We carry only the latest versions of products. Version numbers are current at press time. Products listed here in red are Microsoft Windows Applications

AddStor ... NCP		
4090	SuperStor 2.0	\$83.
Adobe Systems ... NCP		
7547	Adobe Type Manager 2.0 for Windows	69
9623	Adobe TypeAlign 1.0 for Windows	69
6591	Adobe Illustrator 4.0 for Windows	429
	Adobe TypeSets for Business	ea 95
6590	Adobe Streamline 3.0 for Windows	125
7928	Adobe Plus Pack 1.0	129
8367	ATM and Plus Pack Bundle	169
(Entire Adobe Type Library, from 1 to 260 is available. Call for more information.)		
Aldus ... NCP		
8000	Persuasion 2.0 for Windows	329
1341	FreeHand 3.0 for Windows	395
1332	PageMaker 4.0	499
4195	Photostyler 1.0	529
Alpha Software ... NCP		
5104	Alpha FOUR 2.0	329.
Application Techniques ... NCP		
1214	Pizazz Plus 2.0	79
9621	Picture Eze 2.0 for Windows	95
Artisoft ... NCP		
2455	Lantastic AE-2 EtherNet Starter Kit (includes software, 2 EtherNet cards, cable)	479.
2452	AE-2 EtherNet Adapter Card	199.
Atech Software ... NCP		
9435	Publisher's Powerpak 2.1 for WP & Word	49.
4797	AllType 1.0 (universal typeface converter)	49.



Microsoft ... NCP

7010 □ Windows 3.1—Improve Setup, faster printing and better output with True Type font technology, improved support for MS-DOS based applications allowing you to cut and paste between Windows and DOS programs, as well as drag and drop File Manager enhancements all make this latest release of Windows better than ever \$95.

2856 □ Excel 4.0 for Windows—Includes more powerful tools than ever before with smart features like Drag and Drop, Autofill, Scenario Manager for viewing multiple "what-if" scenarios, improved presentation tools, and Help for Lotus 1-2-3 Users 309.

Attitash Software ... NCP		
3904	Dragnet 3.0 for Windows	32
8846	WideAngle 2.0	79.
Automap ... NCP		
2729	Automap 1.0	49.
Avery Dennison ... NCP		
6006	Label Pro 1.6 (Laser)	49.
7336	Label Pro 1.0 for Dot Matrix	49.
Banner Blue Software ... NCP		
3322	Family Tree Maker 2.0	39.
3324	Org Plus Advanced 6.0	65.
2088	Org Plus 1.0 for Windows	125
Berkeley Systems ... NCP		
9885	After Dark 2.0 for Windows	29
Bitstream ... NCP		
7568	FaceLift 2.0 for Windows 2.x/3.0	59.
8040	FaceLift 1.5 for WordPerfect 5.0/5.1	59.
2332	TypeEssentials 1.0 (Headlines)	62.
	TypeEssentials 1.0 (all others)	ea 92
2089	MakeUp 1.0 for Windows 3.0/3.1	95
Borland International ... NCP		
3551	Quattro Pro SE 1.0	47.
6242	Quattro Pro 4.0	319.
7030	Quattro Pro 4.0 Competitive Upgrade	95
9695	Borland's C++ 2.0	325.
1514	Paradox 3.5	499.
7988	Paradox 3.5 Competitive Upgrade	165.
9635	Object Vision 2.0	99
Broderbund ... NCP		
1434	New Print Shop	35.
ButtonWare ... NCP		
6419	PC-File 6.5	85.
Caere ... NCP		
8933	OmniPage Professional 1.0	669
Calera ... NCP		
1769	Fax Grabber 1.0	99
Campbell Services ... NCP		
5068	On Time 1.1 for Windows	75
Central Point ... NCP		
5039	PC Tools 7.1	109
6179	PC Tools Deluxe LAN 7.1	799
8114	Backup 7.1 (DOS and Windows)	79
9751	AntiVirus 1.2	79.
Chronologic Corporation ... NCP		
8849	Instant Recall 1.2	64.
Claris ... NCP		
3394	Hollywood	339.
CompuServe ... NCP		
7546	DOS Membership Kit 1.3	29.
Concentric Data Systems ... NCP		
6575	R & R Relational Report Writer 4.0	159.
Contact Software ... NCP		
1625	Act! 2.1	229.
Corel Systems ... NCP		
5506	CorelDRAW! 2.0	365
2618	CorelDRAW! 2.0 CD ROM	449
3419	Blockbuster Bundle (ext CD-ROM drive & CorelDRAW!)	995

Data Storm ... NCP		
4798	PROCOMM PLUS 2.01	79.
DCA/Crosstalk ... NCP		
5611	Crosstalk 1.2 for Windows	119
Delrina Technology ... NCP		
2446	WinFax Pro 2.0	75
4085	WinFax Pro/Calera FaxGrabber Bundle	149
4325	PerFORM 2.1	95
7351	PerFORMPRO 1.0	179
Digital Research ... NCP		
8288	DR DOS 6.0	67
Discovery Systems ... NCP		
3215	Nautilus Subscription Kit (CD-ROM)	20.
Fifth Generation Systems ... NCP		
7725	Direct Access 5.1	64.
3950	Fastback Plus 3.0	119.
Fox Software ... NCP		
6188	FoxPro 2.0	489
Geoworks ... NCP		
5217	Geoworks Pro	129.
Gibson Research ... NCP		
9832	SpinRite II 2.0	64.
Hayes ... NCP		
7983	Smartcom EXEC 2.1	75.
Helix Software ... NCP		
9627	Netroom 2.1 (single user)	65.
IBM ... NCP		
2666	DOS 5.0 Upgrade	59.
ICOM Simulations ... NCP		
1326	Intermission 2.0 for Windows	29
Individual Software ... NCP		
6222	Resume Maker 1.3	29



Corel Systems ... NCP

5506 CorelDRAW! 2.0—"CorelDRAW! 2.0 is worth every penny. Special effects can even turn inexperienced artists into master draftsmen." Luisa Simone of PC Magazine... \$365.
2618 CorelDRAW! 2.0 CD-ROM 449.



Inset Systems ... NCP

3021 • HiJaak for Windows—Enhances & prints graphics images. Converts 28 raster, 15 vector, & 24 fax card formats. Captures graphics screens from Windows and graphics & text screens from DOS applications \$125.

we opened our doors.



ButtonWare ... NCP

6419 ☐ PC-File 6.5—New! Has a Graphical User Interface! Analyze and manage data with relational retrieve, relational posting, search/query. Also available is the PC-File Application Pack - includes six pre-designed applications! .. \$85.

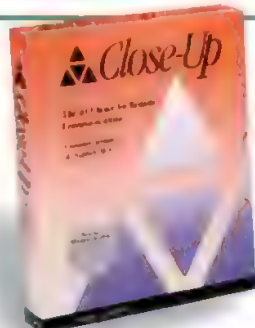
Inset Systems ... NCP		
7298	☐Hijaak 2.1	125.
3820	☐Hijaak 1.0 for Windows	125
7300	☐Inset Plus Hijaak	145.
2040	☐Hijaak Color Sep 1.0	339.
Intuit ... NCP		
2426	☐Quicken 5.0	45.
5596	☐Quicken 1.0 for Windows	45
2474	☐Quicken with QuickPay	75.
LaserTools ... NCP		
6882	☐PrintCache 2.5	99.
Lotus ... NCP		
5417	☐1-2-3 3.1 Plus	415.
5653	☐1-2-3 2.3	335.
1852	☐1-2-3 2.3 Upgrade	95.
2755	☐1-2-3 1.0 for Windows	399
2747	☐1-2-3 for Windows & Ami Pro 2.0 Upgrd.	199
5799	☐Ami Pro 2.0	299.
1847	☐Ami Pro Competitive Upgrade	95.
3523	☐Freelance 1.0 for Windows	349
2750	☐cc:mail DOS Platform Pack	129
2748	☐cc mail Windows Platform Pack	335
2749	☐cc mail 25 user Pack	399.
M-USA Business Systems ... NCP		
3408	☐Pacioli 2000 2.0 (Accounting software)	32.



Hayes ... NCP

7983 ☐ Smartcom EXEC 2.1—A complete communications program with an extensive list of features, supported terminal emulations, file transfer protocols, an easy-to-use interface, and Windows support

MECA ... NCP		
2798	☐ Managing Your Money 8.0	\$109
4603	☐ Tobias' Tax Cut 1040 1991	39
Microcom ... NCP		
4408	☐ Micro Courier 1.0	59
6234	☐ CarbonCopy Plus 6.0	119
4410	☐ CarbonCopy Plus for Windows	119
Micrografix ... NCP		
3627	☐ Windows Draw! 3.0	99
Micro Logic Software ... NCP		
8579	☐ MoreFonts 3.0	75
Microlytics ... NCP		
7931	☐ Random House Encyclopedia 1.0	68
Microsoft ... NCP		
3338	☐ Money 1.0 for Windows	45
7010	☐ Windows 3.1	95
7388	☒ Project 3.0 for Windows	445
2904	☐ Works 2.0	95
2735	☒ Works 1.0 for Windows	129
3337	☒ Publisher 1.0 for Windows	129
7387	☒ PowerPoint 2.0 for Windows	309
6195	☒ Word 2.0 for Windows	309
2856	☒ Excel 4.0 for Windows	309
8137	☐ Office 2.0 for Windows	479
1620	☐ MS-DOS 5 Upgrade	49
1624	☒ Visual Basic 1.0	129



Norton-Lambert ... NCP

2753 ☐ Close-Up for Windows & DOS Dual Pack

Multisoft ... NCP		
4925	☐ PC-Kwik Power Pak 2.1	79.
Niles & Associates ... NCP		
3868	☐ EndNote 1.0	89.
3880	☐ EndNote Plus 1.0	149.
Nolo Press ... NCP		
5122	☐ For The Record 2.0	35.
2982	☐ WillMaker 4.0	39.
Norton-Lambert ... NCP		
2753	☐ CloseUp for Windows & DOS Dual Pack	129
Novell ... NCP		
4000	☐ Network Lite 1.0	69.
Okna ... NCP		
9696	☐ Desktop Set 4.0 for Windows	79
Panacea ... NCP		
2413	☐ WinSpeed 1.0 (Windows accelerator)	55

1-800/800-0004

MMC PC Connection 960M
6 Mill Street
Marlow, NH 03456
SALES 603/446-0004 FAX 603/446-7791



Adobe Systems ... NCP

1598 ☐ Adobe Illustrator 4.0 for Windows—Includes Adobe Type Manager, TypeAlign, Separator, 40 Adobe typefaces & a selection from the Adobe Collector's Editions. Comes with FREE Adobe Streamline 3.0 for the first 90 days ... \$429.

PC Globe ... NCP		
5902	☐PC Globe 4.0	39.
5900	☐PC USA 2.0	32.
Personics ... NCP		
9288	Laptop Ultravision 2.1 (3½" only)	45.
4384	☐Ultravision 2.0	79.
Polaris Software ... NCP		
4395	☐PackRat 4.0	249
PowerUp! ... NCP		
7860	☐Calendar Creator Plus 4.0	52.
7857	☐Labels Unlimited 3.0	59.
7858	☐Express Publisher 2.0	99.
Qualitas ... NCP		
7539	☐386MAX 6.0	59.
7967	BlueMAX 6.0 for PS/2 (3½" only)	79.
Quarterdeck ... NCP		
3221	☐Expanded Memory Mgr. 386 6.0	59.
4586	☐DESQView 386 2.4	129.
QUE Software ... NCP		
4155	☐RightWriter 5.0	54.
Reality Technologies ... NCP		
7891	☐WealthStarter 2.0 w/Charles J. Givens	35.
6572	☐WealthBuilder 1.1	95.
Reference Software ... NCP		
4396	☐Grammatik V 1.0	59.
7483	☐Grammatik Windows 1.0	59
3821	☐Webster's Electronic Dictionary & Thesaurus	59.
Roykore ... NCP		
2473	☐Instant ORG Charting! 1.0	125
8162	☐ABC Flowcharter 1.1	189
Sitka ... NCP		
6675	☐TOPS Network Bundle 3.0	159.
3720	Flash Card (hardware)	155.
Software Marketing Corp. ... NCP		
5145	☐Bodyworks 1.0	45.
Software Publishing ... NCP		
3482	☐Harvard Graphics 3.0	399.
4403	☐Harvard Graphics 1.0 for Windows	399
Software Ventures ... NCP		
6889	☐MicroPhone II 2.0 for Windows	99
Spinnaker ... NCP		
1415	☐PFS WindowWorks 1.0	129
Stac Electronics ... NCP		
1409	☐Stacker 2.0	85.
3524	☐Stacker 2.0 w/16-bit Coprocessor Card	185.
Symantec ... NCP		
3784	☐The Norton Backup 1.2 for Windows	84
3146	☐The Norton Utilities 6.0	115.
3425	☐Q&A 4.0	249.
7999	☐Norton Anti-Virus 2.0	84.

PC CONNECTION

The idea was ours,

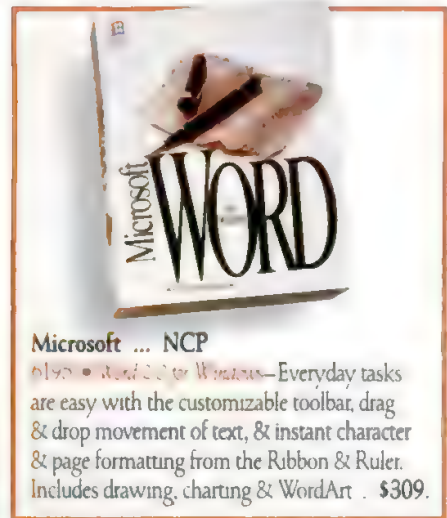


Symantec ... NCP
2000 • Norton Desktop 2.0 for Windows—Adds drag and drop icons, an extensive collection of Norton's best utilities, complete virus protection, and Windows 3.1 support ... \$99.
441 • Norton Desktop 2.0 for Windows ... 165

2359	□The Norton Desktop 2.0 for Windows ...	99.
4431	□Norton Desktop 2.0 & Windows 3.1 ...	165
8378	□Norton PC Anywhere IV 4.5 ...	119.
Systems Compatibility ... NCP		
3949	□The Writer's Toolkit 2.0 for Windows ...	79
Teleware ... NCP		
9847	□M.Y.O.B. for Windows ...	139.
TIMESLIPS ... NCP		
2987	□Timeslips III 4.0 ...	195.
5037	□TimeSheet Pro for Windows ...	135
Timeworks ... NCP		
6253	□Publish-It! 2.0 ...	85.
Tool Technology ... NCP		
3863	WinTools 1.0 for Windows (3½" only) ...	119
Touchstone Software ... NCP		
7420	□Check It 3.0 ...	85
Traveling Software ... NCP		
4407	□LapLink Pro 4.0 ...	95.
WordPerfect Corporation ... NCP		
4214	□WordPerfect Office PC ...	89.
3804	□WordPerfect 5.1 ...	269.
3494	□WordPerfect 5.1 for Windows ...	279.
1466	□WordPerfect 5.1 Additional User ...	199.
XTREE ... NCP		
6161	□XTree Gold 2.5 ...	95.

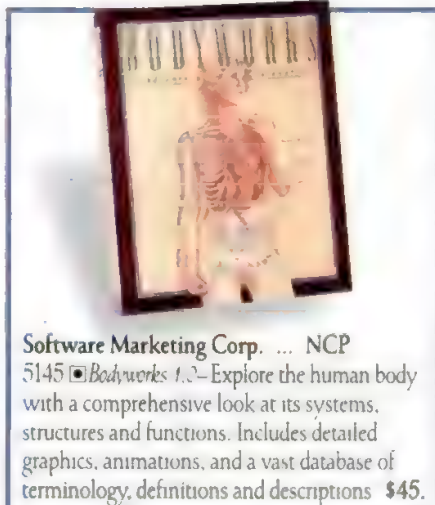
RECREATIONAL/EDUCATIONAL

Abracadabra ... NCP		
3641	□Design Your Own Railroad ...	39.
3629	□Design Your Own Home-Architecture 3.0 ...	49.
3631	□Design Your Own Home-Interiors 1.0 ...	49.



Microsoft ... NCP
6150 • Word 5.0 for Windows—Everyday tasks are easy with the customizable toolbar, drag & drop movement of text, & instant character & page formatting from the Ribbon & Ruler. Includes drawing, charting & WordArt ... \$309.

Broderbund ... CP		
3340	□Kid Pix ...	\$35
8068	□Where in World is Carmen Deluxe ...	49.
3809	Where in World is Carmen Deluxe (CD-ROM) ...	65
1836	□Where in America's Past is Carmen ...	39.
5851	□SimCity from Maxis ...	29
4388	□SimAnt from Maxis ...	39
4411	□SimEarth for Windows from Maxis ...	45
Davidson & Associates ... NCP		
3947	□Math Blaster Plus ...	29
4183	□KidWorks ...	29.
Electronic Arts ... NCP		
3038	□Earl Weaver Baseball II ...	35
4534	□Mavis Beacon Teaches Typing 2.0 (CP) ...	35
3031	□Mavis Beacon for Windows ...	45
3023	□ChessMaster 3000 ...	35
3032	□ChessMaster 3000 for Windows ...	39
Harvard Associates ... NCP		
2324	□PC Logo 3.0 ...	59
HyperGlot Software ... NCP		
(French, German, Italian, Spanish available)		
	□Word Torture for Windows ...	ea. 34
	□Word Torture 3.0 ...	ea. 29
ICOM Simulations ... NCP		
3717	Sherlock Holmes, Consulting Detective (CD) ...	39.
Knowledge Adventure ... NCP		
1483	□Sports Adventure 1.0 ...	55
3861	□Knowledge Adventure 1.0 ...	55



Software Marketing Corp. ... NCP
 5145 □Bodyworks 1.0—Explore the human body with a comprehensive look at its systems, structures and functions. Includes detailed graphics, animations, and a vast database of terminology, definitions and descriptions \$45.

Microsoft ... NCP		
7881	□Entertainment Pack I for Windows ...	29
4079	□Pack II ...	29
2858	□Flight Simulator 4.0 ...	39
Penton Overseas ... NCP		
	□VocabuLearn/ce Levels I & II (French, Italian, German, Spanish, Russian, Hebrew and Japanese) ...	ea. 35.
Personal Training Systems ... NCP		
Training tutorials - beg. to adv. for Windows, Excel, PageMaker, & Lotus 1-2-3 (3½") ...		
	ea. 65.	
Sierra ... CP		
9466	□Space Quest IV (VGA) ...	45.
3193	□Police Quest III (VGA) ...	45.
Software Toolworks ... NCP		
3294	□Game Pak (5 games in one) ...	32.
5032	Miracle (piano teacher) (incl. kybd.) ...	339.
Spectrum Holobyte ... NCP		
4834	□Super Tetris ...	29.
4833	□Super Tetris for Windows ...	29.
Toyogo ... NCP		
2701	□Nemesis Go Master 5.0 for Windows ...	35
7674	□Nemesis Go Master 5.0 ...	35
True BASIC, Inc. ... NCP		
	□Kemery/Kurtz Math Series ...	ea. 45.
Walt Disney Computer Software ... CP		
2629	□Mickey's 123's ...	29
2624	□Mickey's ABC's ...	29.
4398	□The Animation Studio ...	79.
4416	Sound Source ...	29.



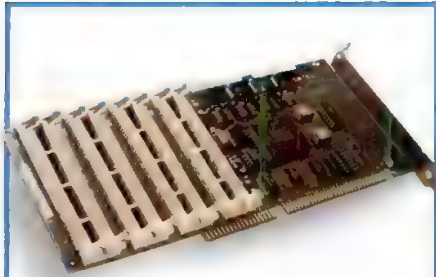
Berkeley Systems ... NCP
4000 • After Dark 1.0 for Windows—New! 40 incredible displays to prevent screen burn-in 5 New Displays, Digital Sound, True Color Graphics, WallZapper, new fish, and MultiModule DOS blanking to black ... \$29.

HARDWARE

Warranties listed next to manufacturer.

American Power ... 2 years		
7108	Smart UPS 400 ...	339
7105	Smart UPS 600 ...	425.
3858	Back-UPS 400 ...	185
3823	Back-UPS 600 ...	299.
Appoint ... limited lifetime		
2469	Thumbelina PC ...	62
2480	MousePen Pro PC ...	62
ATI Technologies ... 2 years		
9821	VGA Basic-16 (640 x 480, 16 colors) ...	69
9985	VGA Integra (1024 x 768, 16 colors) ...	95
2706	VGA Wonder XL (with 1 MB) ...	199
2382	Graphics Vantage VGA (with 1 MB) ...	359
9822	8514/Ultra (with 1 MB) (requires VGA) ...	419
2012	Graphics Ultra with VGA (with 1 MB) ...	479
1825	2400etc/i Modem (with 9600 SendFax) ...	139.
9620	9600etc/e Modem ...	369.
3902	Stereo•F/X ...	149
3900	VGA Stereo•F/X (w/512K, upgrd. to 1 MB) ...	329
Boca Research ... 5 years		
7150	BOCARAM/AT PLUS (2 MB) ...	199
7139	(4 MB) ...	299
6998	I/O Board for AT ...	49
6999	I/O Board for Microchannel (S/S/P) ...	95
8380	BasicVGA (256K, 640 x 480) ...	49
8381	SuperVGA (1 MB, 1024 x 768) ...	119
3859	2400 Internal Modem (V.42, MNP Level 5) ...	85
2502	2400 Baud Internal Modem ...	49
4001	2400 Baud External Modem ...	59.
Bravo Communications ... 2 years		
7400	2 Position Laser Compatible Switch Box ...	109
Brown-Wagh ... 1 year		
8578	Creative Labs Sound Blaster ...	109
2336	Creative Labs Sound Blaster Pro ...	189
Caere ... 1 year		
8158	Typist Plus Graphics ...	389
Canon ... 1 year		
We are an authorized Canon Service Center		
7894	BJ-10ex Printer (4.6 lb.) ...	329
7897	BubbleJet Ink Cartridge (BJ-10ex) ...	23
7896	BJ-10ex Sheet Feeder ...	75
Cardinal ... 1 year		
2719	MB2296SR Internal Send/Receive Fax ...	105
1132	386-SX-16 Motherboard 01K ...	279
1197	386-SX-25 Motherboard 01K ...	349
1480	Cardinal 9600 Internal Modem ...	329
2783	Cardinal 9600 External Modem ...	349
CH Products ... 1 year		
7935	Game Card III Auto ...	33
7340	FlightStick ...	45
Curtis ... lifetime		
1708	Ruby-Plus SPF-2+ ...	65
7358	Command Center SPF-4 ...	89

the savings are yours.



Intel ... 5 years

1086 Matched Memory Classic Memory Board 2K—Great performance with a great price to match. EMS 4.0 compatibility built in to the hardware for up to 90% faster processing. Expandable to 8 MB using 1 MB SIMMs ... \$139.

Cyrix Corporation ... 5 years		
MATH COPROCESSORS		
9875	FasMath 83D87-25	159.
9876	FasMath 83D87-33	169.
9877	FasMath 83S87-16 (SX compatible)	99.
Epson ... 2 years		
We are an authorized Epson Service Center.		
1906	FX-850 (80 col., 264 cps, 9 pin)	319.
1904	FX-1050 (136 col., 264 cps, 9 pin)	449.
2358	LQ-570 (80 col., 252 cps)	289.
2361	LQ-870 (80 col., 330 cps)	489.
2357	LQ-1170 (136 col., 330 cps)	669.
5184	LX-810 (80 col., 180 cps, 9 pin)	185.
Everex ... 1 year		
1683	Tempo LX Notebook (5 MB, 60 MB HD)	call
Hauppauge Computer ... 1 year		
9870	25 MHz 386N Motherboard for AT (1 MB)	729.
9034	33 MHz 386N Motherboard for AT (1 MB)	789.
3670	33 MHz 486 Motherboard for AT	1229.
4008	Win/TV	439.
Hayes ... 2 years		
7391	ULTRA 96 Modem	669.
5024	ULTRA 144 Modem	799.
1345	OPTIMA 24 Modem	155.
3522	OPTIMA 96 Modem	389.
9884	Pocket Edition 2400	119.
Hewlett-Packard ... 1 year		
3175	DeskJet 500C (color) (with toner)	749.
3957	LaserJet IIP Plus (with toner)	879.
9993	LaserJet IIIP (with toner)	1099.
6754	LaserJet III (with toner)	1599.
Intel ... 5 years		
3864	14.4EX Modem	549.
6421	2400B MNP Internal Modem	189.
6420	2400EX MNP Modem	225.
7880	9600EX Modem	469.
5336	Above Board Plus 8.2 MB	379.
5342	Above Board Plus 8 I/O 2 MB	399.
1086	Matched Memory Classic Memory Brd. 2K	139.
7782	SatisFAXtion (fax board)	349.
8903	Matched Memory 4 MB (PS/2)	199.
	Matched Memory (for LaserJet IIP, III, IIIP IIID)	
1810	1 MB	89.
3076	1787 2 MB	149.
3076	Snap-In 386 (for PS/2 50/60 & IBM AT)	389.
3358	Power Pak (Snap-In 386 & Above Board Microchannel 4 MB)	799.
MATH COPROCESSORS		
7385	80287XL (16 MHz 80286 CPU's)	89.
4750	80387SX (16 MHz 80386SX CPU's)	129.
6830	80387SX-20 (20 MHz 80386SX CPU's)	139.
5409	80387DX	219.

Kensington Microware ... 1 year

Full line available. Partial listing

4973	PowerTree 20 (6 outlets, EMVRFI Filtering)	\$27.
2582	Master Piece Plus	99.
7899	Expert Mouse serial	99. 7900 bus
3311	MasterStand	59.
3312	LaserStand (for HP LaserJet)	125.
Keytronic ... 3 years		
4518	101 Plus Keyboard	99.
Kraft ... 5 years		
5801	Game Card (2 ports)	27.
5813	Game Card with Thunderstick	49.
5800	3 button Thunder Joystick	29.
Logitech ... limited lifetime		
3996	Trackman 2 (combo)	84.
2343	Trackman Portable	99.
7975	ScanMan 256	289.
1322	FotoMan (camera for your PC)	549.
4727	Kids Mouse	45.
3295	MouseMan (combo) 69 9766 (cordless) 89.	
Megahertz ... 5 years		
3020	T224FM 96/24 Pocket Fax Modem	249.
1187	T324FM 96/24 Fax Modem (Toshiba Lptps.)	269.
Micron Technology ... 2 years		
7595	2 MB Expansion for HP LaserJet IIP or III	119.



Practical Peripherals ... lifetime

2425 PM14400FXSA Modem/Fax—Get ultra high speed 14,400 bps data transmission as well as Group III S/R fax capabilities in one integrated and affordable package. Includes QuickLink II for modem and fax communications ... \$399.

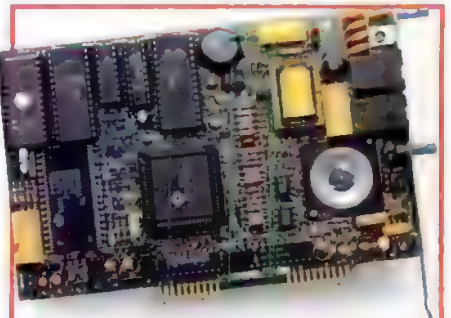


Canon ... 1 year

7894 BJ-10ex Printer—New enhanced version of the popular 4.6 lb. printer provides laser-like print quality (up to 360 dpi) on plain bond paper, envelopes or transparencies. Available in white or gray ... \$329.

Microsoft ... lifetime		
7597	Microsoft Mouse (bus or serial)	85.
2897	Mouse with Paintbrush (bus or serial)	99.
2898	Mouse with Windows 3.0 (bus or serial)	149.
1896	Ballpoint Mouse (serial only)	119.
MicroSpeed ... 1 year		
2763	MicroTRAC (serial & PS/2 interface)	57.
6330	PC-TRAC Trackball (PS/2)	79.
6007	serial 75 6008 bus	89.
Microtek ... 1 year		
2736	ScanMaker 600G (gray-scale scanner)	759.
2739	ScanMaker 600Z (color scanner)	1249.
2740	ScanMaker 1850 (slide scanner)	1649.
Mouse Systems ... lifetime		
5997	Trackball (1 yr wrnty) serial	49. bus
3213	PC Trackball II (serial)	69.
7878	PC Mouse III (serial)	89. (bus)

NEC ... 2 years		
3637	CDR-36M Portable CD-ROM Drive	399.
3651	CDR-73M CD-ROM Drive	589.
2478	CD Gallery with CDR36 for PC	579.
4252	Multisync 3FGX Monitor (14")	689.
4249	Multisync 4FG Monitor (15")	799.
Okidata ... 1 year		
We are an authorized Okidata Service Center		
5093	OL400 Page Printer (4 ppm)	649.
5094	OL830 Page Printer (8 ppm)	1329.
3025	Toner Cartridge	25.
Orchid Technology ... 4 years		
7863	ProDesigner VGA IIS (with 1 MB, includes RAMDAC chip)	249.
4071	Fahrenheit 1280i with 1 MB	365.
Pacific Data ... lifetime/60 day MBG		
5072	25 Cartridges in One! (for DeskJet 500)	105.
5071	25 Cartridges in One! (for DeskJet Plus)	105.
6779	25 Cartridges in One! (LJ II, IID, IIP, III, IIID)	269.
	Memory upgrade for LJ IIP, III, IIID, IIIP:	
7055	2 MB 139 7759 4 MB	245.
	Memory upgrade for LaserJet III/IIID:	
6838	2 MB 245 6836 4 MB	359.
7158	Pacific Page PE (LJ IID, IIP, III, IIID, IIIP)	299.
9833	Pacific Page XL (w/accelerator board)	699.



Prometheus ... 2 years

1222 ProModem Ultima Home Office—Integrated system of data, fax & voice. 14,400 bps data modem with V.42bis/MNP 5 data compression & error correction, plus 9600 bps send/receive fax, & full voice capability ... \$489.

1-800/800-0004

MMC
Master Micro Channel

PC Connection

960M

6 Mill Street
Marlow, NH 03456

SALES 603/446-0004 FAX 603/446-7791

PC CONNECTION®

© COPYRIGHT PC CONNECTION, INC., 1992 PC CONNECTION, PCTV AND THE RACCOON CHARACTER(S) ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC., MARLOW, NH. ALL OTHER TRADEMARKS REMAIN THE PROPERTY OF THEIR RESPECTIVE COMPANIES

800/800-0004.

PC Power & Cooling ... 2 years

REPLACEMENT POWER SUPPLIES

3203	Turbo Cool 200	\$149.
7915	Turbo Cool 300	159.

Practical Peripherals ... lifetime

3103	2400 Baud Internal Modem	79.
3102	2400 Baud External Modem	99.
8993	2400 Baud Internal Modem (V.42 bis)	115.
8994	2400 Baud External Modem (V.42 bis)	125.
8132	PM2400 Pocket Modem	109.
2266	PM9600 Internal Modem	275.
7934	PM9600SA Modem	289.
2264	PM2400FX96 (int. modem/fax)	95.
1344	PM2400FX96SA (ext. modem/fax)	99.
3803	PM14400FX96 (int. modem/fax)	359.
2425	PM14400FXSA (ext. modem/fax)	399.

Prometheus ... 2 years

1222	ProModem Ultima Home Office	489.
------	-----------------------------	------

Targus ... lifetime

1305	Universal Notebook (computer case)	69.
------	------------------------------------	-----

TheComplete PC ... 2 years

5828	TheComplete Communicator	299.
------	--------------------------	------

Tripp Lite ... 2 years

6199	Isobar 4-6 (4 outlets, Gold Seal Warranty)	49.
6200	Isobar 6-6 (6 outlets, Gold Seal Warranty)	59.
6201	Isobar 8-12 (8 outlets, Gold Seal Warranty)	69.

Video 7 ... 7 years

9768	VRAM II VGA 1 MB	329.
------	------------------	------



AddStor ... NCP

4090  SuperStor 2.0—Double your disk capacity with an advanced, feature rich software only data compression product. Easy to install and use. Compatible with Windows and all applications. \$83.

Zoom Telephonics ... 7 years

1307	Int. 2400 Baud w/9600 Baud Fax Modem	99.
1178	Ext. 2400 Baud w/9600 Baud Fax Modem	99.
1181	2400 Baud V.42 bis Modem (2 year)	115.
3574	Ext. 2400 Baud V.42/9600 Baud Fax	145.
1166	2400 Baud External Modem	69.
3386	FaxModem AFC (2400 baud modem, 9600 send, 4800 receive fax)	69.
3075	9600 V.32 Turbo Internal Modem (2 yr.)	329.
1494	9600 V.32 Turbo External Modem (2 yr.)	329.
4100	24/96 Internal Fax Modem/WinFax Pro/Calera Fax Grabber Bundle	239.
4098	24/96 External Fax Modem/WinFax Pro/Calera Fax Grabber Bundle	239.

DRIVES

Colorado Memory Systems ... 1 year

4194	Jumbo 120 Tape Backup	199.
4354	Jumbo 250 Tape Backup	269.

Conner Peripherals ... 1 year

2339	CP30104 120 MB IDE HD (19 ms)	399.
1337	CP3204 200 MB IDE HD (16 ms)	599.

IOMEGA ... 1 year

2224	We are an authorized Iomega Service Center. Bernoulli II Transportable 90 MB	799.
2616	Internal 90 MB Bernoulli	799.
2500	PC2B Controller	199.
2530	90 MB Cartridge	149.
2467	90 MB Cartridge Tripak	439.



Zoom Telephonics/Delrina Tech./Calera

Zoom 2496 Fax Modem/Delrina WinFax Pro/Calera Fax Grabber Bundle—Complete Windows fax solution! Get this 9600 bps S/R fax with 2400 baud modem along with Delrina's WinFax Pro & Calera's Fax Grabber at a special

price. WinFax Pro was named "Best of 1991" by both PC Magazine & Windows Magazine. Fax Grabber converts fax images to many popular text formats. Also includes a copy of Norton Desktop. Offer good through 5/31/92
4100 Int. Bundle \$239. 4098 Ext. Bundle \$239.

Mountain Network Solutions ... 2 years

2917	40-120 MB Internal Tape Drive	259.
3812	FS8500 IDE Tape Backup (304M)	569.
6153	DC2120 Tape Cartridge (5 pack)	149.

Pacific Rim ... 1 year

1304	1.2 MB External (for any parallel port)	239.
2761	1.44EX MB External (for any parallel port)	239.

Quantum ... 2 years

8304	Plus Hardcard II XL 50 MB (9 ms)	299.
8287	Plus Hardcard II XL 105 MB (9 ms)	449.
4060	105 MB Drive Kit for MC PS/2's (13 ms)	789.

TEAC ... 1 year

4870	1.44 MB Drive for PC/XT (3 1/2")	59.
4326	1.44 MB Drive for AT (3 1/2", w/Bastech)	79.
4951	720k Drive for PC/XT (3 1/2")	55.
6951	1.2 MB Drive for AT (5 1/4")	65.
4414	3 1/2"/5 1/4" Dual Floppy Drive	165.

MEMORY

6556	256k DRAM (100 ns, set of 9)	19.
5510	1 MB x 9 SIMMs (80 nanosecond)	49.
2497	4 MB x 9 SIMMs (80 nanosecond)	179.
5746	1 MB Chips (80 ns, set of 9)	49.

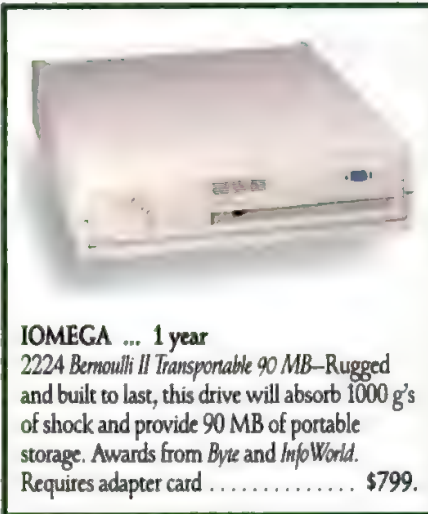
DISKS/MEDIA

3M ... lifetime

3943	DC2000	17.	1581 DC2120	24.
------	--------	-----	-------------	-----

Fuji ... lifetime

2214	3 1/2" DS Disks (10)	9.	2242 (50)	32.
2215	3 1/2" HD Disks (10)	15.	2241 (50)	59.



IOMEGA ... 1 year

2224 Bernoulli II Transportable 90 MB—Rugged and built to last, this drive will absorb 1000 g's of shock and provide 90 MB of portable storage. Awards from Byte and InfoWorld. Requires adapter card \$799.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship
- If we must ship a partial order, we never charge (freight on the shipment(s) that complete the order (in the U.S.))
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail
- International orders U.S. \$250 minimum. Manufacturer support and upgrade eligibility may be limited outside the U.S.A
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to approval.
- COD max. \$1000 Cash or cashier's check
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- To order, call us Monday through Friday 8:00 a.m. to 1:00 a.m., or Saturday 9:00 a.m. to 5:30 p.m. Eastern Time. You can call our business offices at 603/446-3383 Monday through Friday 9:00 a.m. to 5:30 p.m.

SHIPPING

Note: Accounts on net terms pay actual shipping.

Continental US:

- For heavy hardware items such as printers, monitors, Bernoulli Boxes, etc. pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add \$3 per order to cover UPS Shipping. For such items, we automatically use Airborne Express at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:

- For monitors, printers, Bernoullis, computers, hard drives, and power backups, actual UPS Blue charge will be added. For all other items, add \$3 per order.

Alaska and outside Continental US:

- Call 603/446-0004 for information.



PC Parade.

**From Marlow to Main Street.
(Or, a decade of service to beat the band.)**

Back in July of '82, shortly after the introduction of the IBM-PC, we marched (to the beat of a different drummer, of course) smack dab into the middle of the PC marketplace. Our idea was simple—to sell add-ons and software exclusively for IBM personal computers. Our first warehouse was even simpler—a closet in a converted sawmill in the one-horse (or was that a moose?) town of Marlow, NH (pop. 542 at the time). Our goals were rather modest, too—we just wanted to be the fastest, most convenient, and most reliable source for PC products anywhere on Planet Earth.

Over the last ten years, we've

learned that our small-town values play pretty well across America. And that anything humans can do, our high-stepping raccoon mascots can do better. So as our first decade draws to a close, we'd like to thank all our customers for making it so successful. May it never rain on your PC parade!

We'll give you the shirt off our backs!

The Official PC Connection 10th Anniversary Shirt, that is. A collector's item that can be worn with pride and panache at road races, corporate volleyball games, and even user-group meetings. It's free to anyone who places an order of \$750 or more between now and June 30. Specify S, M, L, XL or children's.



Display your micro muscles with the all-cotton PC Connection 10th Anniversary Shirt. One per customer. Not available to net accounts.

PC CONNECTION®

©COPYRIGHT PC CONNECTION, INC., 1992. PC CONNECTION AND THE RACCOON CHARACTERS ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC., MARLOW, NH.

capability built into the package is useful.

The Personnel Management module provides tracking of basic information such as date of hire, salary, and other key dates such as salary review schedules.

Manage: Complete offers a strong feature set, an attractive but slow interface, and some useful special features—albeit at added cost. While the product isn't as rich in features as *Peachtree Complete III*, it is much easier to use and provides more than enough functionality to automate most any business.

SOFTWARE PRICE WATERHOUSE REPORT

FACT FILE

Manage: Complete

Management Information Software Inc.,
3301 Gandy Blvd., Tampa, FL 33611-
2931; 800-825-5647.

List Price: \$299.95.

Requires: 640K, DOS 3.0 or later.

CIRCLE 481 ON READER SERVICE CARD

M.Y.O.B.

by Thomas White

For ease of use and speedy access to key information, the \$249 Microsoft Windows-based *M.Y.O.B.* package, from Teleware, outpaces all the other Windows products reviewed in this roundup. To round out its basic accounting modules—General Ledger, Accounts Payable, Accounts Receivable, Checkbook, and

LOW-COST ACCOUNTING: Getting Easier Every Day

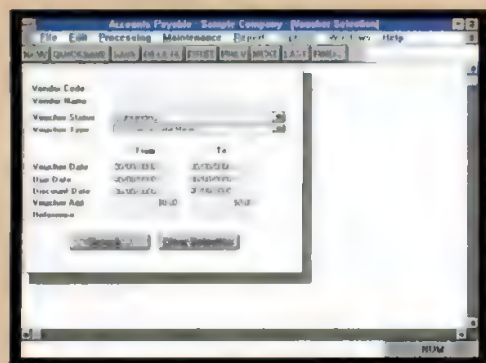
by Ted Stevenson

As competition heats up in the low-cost accounting software market, packages are sorting themselves into two broad categories: those designed for accounting professionals that emphasize features and those designed for nonaccountants that strive for ease of use.

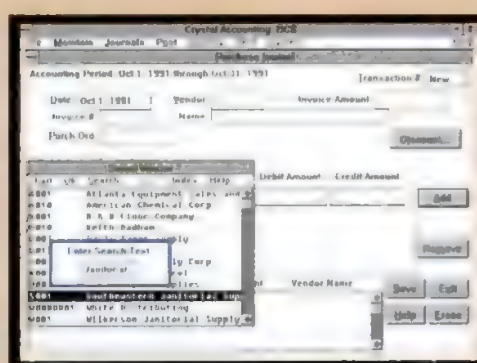
The latter group tends to use the computer screen to a greater advantage by designing data entry and report screens to look like familiar business forms that people already understand how to use. While this approach is certainly not

the exclusive province of Microsoft Windows, a number of the newer packages have embraced that environment and take advantage of its graphical prowess as well as its advanced file- and data-handling capabilities.

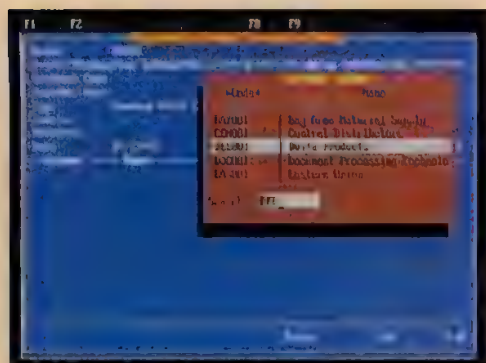
Microsoft Windows' Multiple Document Interface (MDI), which allows several modules to be open simultaneously, and dynamic data exchange (DDE), which allows easy sharing of information between software applications, promise to make accounting on the personal computer even easier and more streamlined in the future.



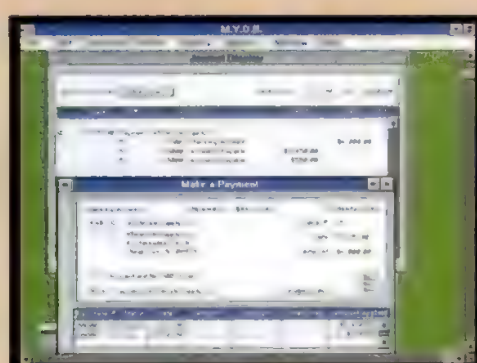
Access to Platinum provides features geared to businesses with large numbers of transactions. For example, instead of selecting vouchers for payment one by one, *Access* lets you select batches of vouchers by various criteria, including due dates or voucher amounts.



When you click the right mouse button on the vendor field, *Crystal Accounting* displays a lookup window that lists all of your vendors. If you don't see the desired vendor in the window, you can search by vendor name.



DacEasy Accounting's lookup table capabilities are comprehensive. To specify lookups based on name or number, just type as many characters of the item as you remember, and *DacEasy* jumps to the closest item.



M.Y.O.B.'s Traceback feature can save you hours of time spent investigating balance discrepancies. When you click on the arrow to the left of a transaction in the Disbursements Journal window (top), *M.Y.O.B.* displays the invoice numbers included in that payment. To see the invoices, just click next to any of the invoice numbers.

SOFTWARE PRICE WATERHOUSE REPORT

Inventory—*M.Y.O.B.* provides several features to help you set up your books. The five sample charts of accounts, geared toward different industries, are fairly standard, but *M.Y.O.B.* stands out from the crowd with its unique on-line setup task list. Just click on a task—Entering Customers, for example—and *M.Y.O.B.* takes you to the appropriate screen and gives you detailed instructions on what to do. When you're done, *M.Y.O.B.* returns you to the Setup screen and checks off the completed task.

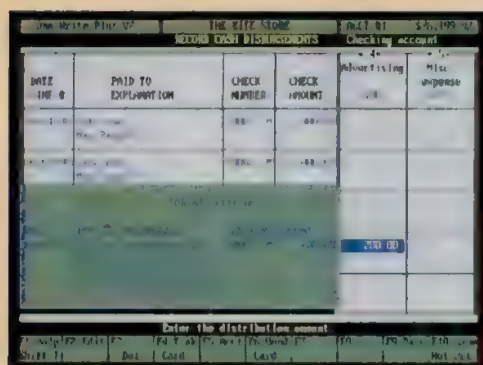
M.Y.O.B.'s documentation is quite thorough and includes helpful write-ups on how to handle more complex accounting functions such as a return on a partially paid invoice. A tutorial that walks you through the basic accounting functions is also included.

The Sales and Receivables module does a good job of printing sales invoices, relieving inventory, and producing customer statements. You can assess finance

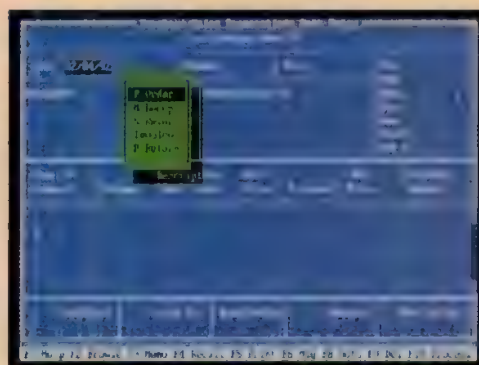
charges to overdue invoices and apply a discount percentage to each line item. The sales analysis and receivable analysis functions provide the small-business owner with an on-line view of key data, such as sales and gross margin by product. A Windows package through and through, *M.Y.O.B.* will even graph this information for you.

DOESN'T DO EVERYTHING

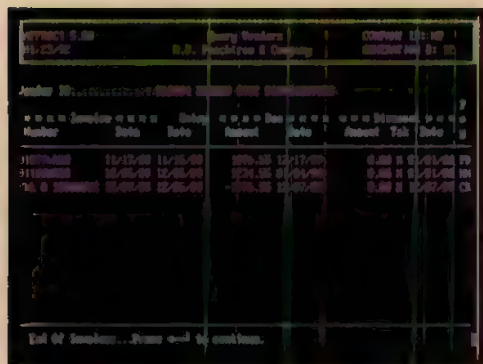
While it is a good all-around accounting package, the absence of a number of spe-



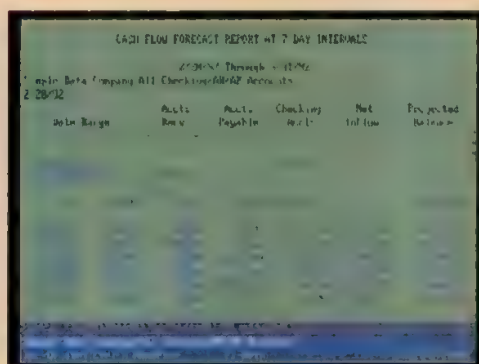
One-Write Plus Accounting Works uses an easy-to-understand data entry screen that resembles a check. Like a checkbook, the *OWP* form has columns for recording information about the payment.



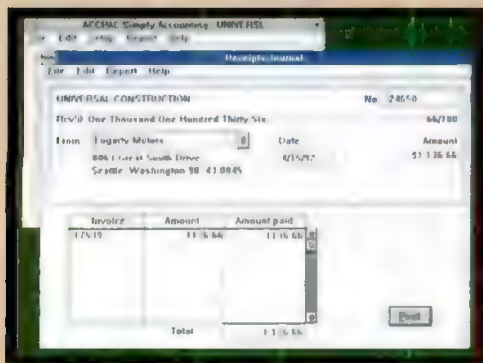
Pacioli 2000's streamlined data entry approach uses a single screen for entering purchase orders, material receipts, sales returns, invoices, and purchase returns.



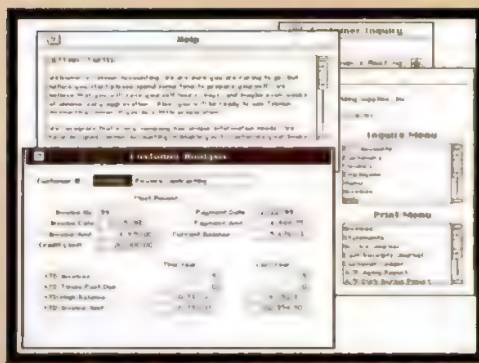
Peachtree Complete III's convenient Query Vendors screen displays historical detail for the last payments and invoices, as well as individual transaction details.



Quickbooks' unique Cash Flow report lets small businesses accurately project the availability of their most critical asset—cash.



ACCPAC Simply Accounting for Windows uses a graphical check metaphor for both its cash receipts and cash disbursements screens. This approach makes your work extremely intuitive.



Teknon Accounting's Customer Analysis screen provides a snapshot of a customer's activity, including last purchase and current balance, plus summary figures for the current and previous years. It even tracks when the customer was late with payments.

cific features may disqualify it for some companies. Unlike many of the packages we reviewed, *M.Y.O.B.* does not provide a Payroll module or print 1099 forms.

Account IDs are limited to four digits plus a leading digit indicating the account type (for example, 1=assets, 2=liabilities). The way you set up your chart dictates the summarization of your financial statements, so you'll want to take time in planning its structure. Unfortunately, the chart of account structure does not provide for departments, costs centers, or other reporting hierarchies. Although *M.Y.O.B.* provides a number of ready-made financial report formats, it does not offer a true report writer.

Further, while most accounting packages save data automatically as you enter transactions, saving your work in *M.Y.O.B.* requires a File/Save operation. While this isn't particularly taxing, it does increase the chances of data loss through a combination of forgetfulness and accident. The system also seemed a bit slow, even on a 386 computer.

Receivables has its weaknesses, too, including an inability to perform backorders or assign multiple sales tax jurisdictions to an invoice and the lack of sales tax reporting. Teleware promises to have backorder capability in Version 3, due out this summer.

Payment terms are set up for each vendor and cannot be changed for individual POs. Nor will *M.Y.O.B.* let you select vouchers to pay by date. Instead, each vendor and each voucher must be paid individually.

TAKING THE WINDOWS ADVANTAGE

On the bright side, *M.Y.O.B.*'s forms-customization facility truly taps the power of the Windows environment, letting you customize your checks, statements, invoices, and purchase orders to your own specifications. This tool displays the form on-screen, WYSIWYG fashion, and allows you to move any field by dragging it to the position you desire. You can change the print size of any field, paste your company logo or any graphic from the clipboard, add additional text, and draw boxes. Not only can you have it your way,

you can print on plain paper and save the cost of preprinted forms.

Custom forms are great, but from an accounting point of view, it is *M.Y.O.B.*'s ability to trace back automatically to source entries that really sets it apart. For instance, when you display the Cash Disbursements Journal, you can click on any journal entry and *M.Y.O.B.* displays the check payment screen for the entry

and each of the POs that was paid with that check. If you want to see the details of a specific PO, click on it and *M.Y.O.B.* displays the originating PO. This feature, available throughout the package, is a powerful tool you'll find in no other package, low or high end; the Windows GUI makes it a reality.

M.Y.O.B. facilitates price changes on inventory items with its Set Item Prices option, which allows you to specify a percentage markup, percentage margin, or a gross profit amount for one or more items. Item cost is based on last purchase price or average cost. Several handy inventory reports can be found in *M.Y.O.B.* as well: an Inventory Count sheet for physical inventory counts; a Price Analysis report that lists sales price, cost, and profit margin for each item; and an Analyze Inventory report that lists quantity on hand and any outstanding sales orders or purchase orders. *M.Y.O.B.* also allows

you to set up a single-level Bill of Materials, and when your top-level item needs to be replenished, an autobuild feature automatically builds any quantity of the item you specify and relieves the subcomponents and update costs.

DO IT

Another highly unusual and helpful *M.Y.O.B.* feature is the To Do list. The To Do list displays key accounting tasks that should be performed periodically, such as listing overdue payables and receivables, and flags date-sensitive information like payable discounts that will soon expire. Clicking on any specific item, such as an overdue payable, takes you to the appropriate screen—in this case the check writing screen—so you can do what's necessary. *M.Y.O.B.* helps further by filling in as much of the screen as it can for you.

These and other innovative *M.Y.O.B.* tools help you not only to keep your accounts but to manage your small business. Although not without faults, *M.Y.O.B.* is a fun, flexible package that balances functionality with ease of use better than any other we looked at. And it shows better than its competitors what Windows can do for small-business accounting. Unfortunately, if you need a Payroll module or LAN support, you will have to look elsewhere.



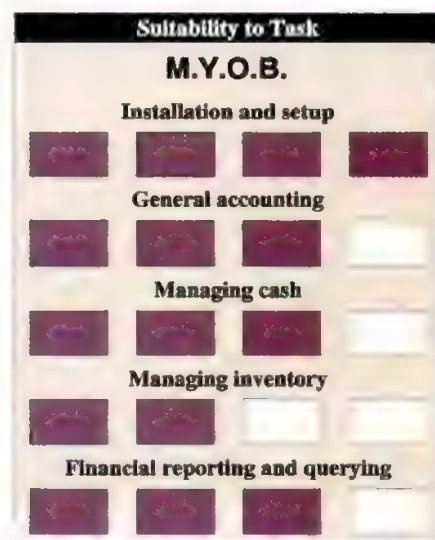
M.Y.O.B., Version 2.0

Teleware Inc., 300 Roundhill Dr., Rockaway, NJ 07866; 800-322-6962, 201-586-2200.

List Price: \$249.

Requires: 2MB RAM, DOS 3.1 or later, Microsoft Windows 3.0.

CIRCLE 482 ON READER SERVICE CARD



One-Write Plus Accounting Works

by Suzanne Colvin

Great American Software's *One-Write Plus Accounting Works*, long popular with small businesses for its ease of setup and ease of use, is now stronger than ever, thanks to the addition of *Accounting Works*, Version 3. This set of ingenious

A Sure Cure For Amnesia.

Okay. Maybe your system hasn't exactly lost its memory.

The fact is, it never had enough to do the things that memory hungry software like Windows needs.

As industry experts will tell you, adding memory to your system is the single best way to improve your system's performance—and your efficiency. Which is

great if you're willing to pay around \$200 per megabyte to your system's manufacturer for a memory upgrade.

We offer an option. Kingston Technology makes over 350 memory upgrades for industry leading PCs, laser printers and workstations like the ones shown here. Chances are good that we have the memory upgrade your system needs.

Our memory is reliable, guaranteed completely compatible, warranted for at least five years and individually tested. Add our technical support, and you'll know that when you upgrade with Kingston, you won't get let down. And all this for a fraction of what you would have paid for an original part.

Maybe that's why Fortune 500 companies, universities and government agencies staffed with people like you choose Kingston for the memory they need to get the most from today's software.

And we don't just make memory. Our SX/Now! family of processor upgrades give your 286 systems a future by replacing the outdated processor with a Windows and OS/2 ready 386SX.

Our internal storage upgrades and external storage subsystems provide flexible, removable and expandable mass data storage.

So remember, when you need memory you have a choice.
Choose Kingston.



Kingston Memory Supports These Leading Systems:

ALR
Apple
AST
Canon
Compaq
Data General
DEC
Dell
Epson
Everex
Hewlett-Packard
IBM
NCR
NEC
Okidata
Olivetti
Packard Bell
Panasonic
Silicon Graphics
Sun
Texas Instruments
Toshiba
Zenith

(800) 835-6575

MANUFACTURED BY

Kingston
TECHNOLOGY CORPORATION

17600 Newhope Street
Fountain Valley, CA 92708
Tel. (714) 435-2600
Fax (714) 435-2699

All trademarks and registered trademarks are of their respective companies

CIRCLE 106 ON READER SERVICE CARD

business tools includes a spreadsheet link, *@Accounting*, a data tracking feature, *SuperTrack*, and a form-letter facility, *Get Paid Plus*. The \$199.95 package has three of the standard accounting modules—G/L, A/P, and A/R—plus Payroll. Missing is an Inventory module, but *SuperTrack* can handle much of the inventory-management function. The total package adds up to an intriguing combination of accounting and business-management tools.

CLASSIC DESIGN

The accounting portion, *One-Write Plus*, is modeled after the well-known One-Write manual accounting system made popular by companies such as Safeguard and McBee. Great American has built the simplicity and usability of this manual approach into *One-Write Plus*, producing software that's easier to learn and use than any other small-business accounting package we tested.

One-Write Plus's data entry screens are nicely designed, easy to navigate, and closely resemble typical business forms a small-business owner encounters every day. And just as in manual One-Write systems, these forms overlay the spreadsheet that "captures" all transactions. This approach allows you to view numerous transactions on-screen quickly, a great time-saver.

A logical menu structure, 14 standard charts of accounts designed for different industries, and sample company data all make *One-Write Plus* a breeze to get up and running. Customers and vendors can be added on the fly, and lookup windows are supported in every applicable data entry screen. *One-Write Plus*'s unique 80-character instruction prompt provides information on the task at hand, eliminating the need to make frequent trips to the help menu.

STANDARD MODULES

One-Write Plus's G/L module utilizes a four-digit account number plus an optional two-digit department number, which allows you to produce balance sheets and income statements for the entire company or by departments. *One-Write Plus* uses current-period balances to create budgets automatically. If you require other types of financial reports, you can fire up the spreadsheet interface, *@Accounting*.

While not especially sophisticated, the A/P module is intuitive and easy to use.

For example, it easily accommodates one-time vendors, another great time-saver. Vouchers can be automatically selected for payment on a specified date, and *One-Write Plus*'s procedure for voiding checks is commendably simple: You just highlight the transaction to be voided and press F3. A nice touch to add to the AP would be the ability to track and print 1099 forms.

One-Write Plus's Accounts Receivable module is oriented toward the service business or professional. For example, unlimited text can be included on invoices, making it easy for attorneys, architects, and accountants to produce professional-looking invoices without the help of a word processing software package. Customer accounts can be designated as open item or balance forward. Since *One-Write Plus* relies entirely on its *SuperTrack* module for Inventory, however, none of the standard inventory features are supported.

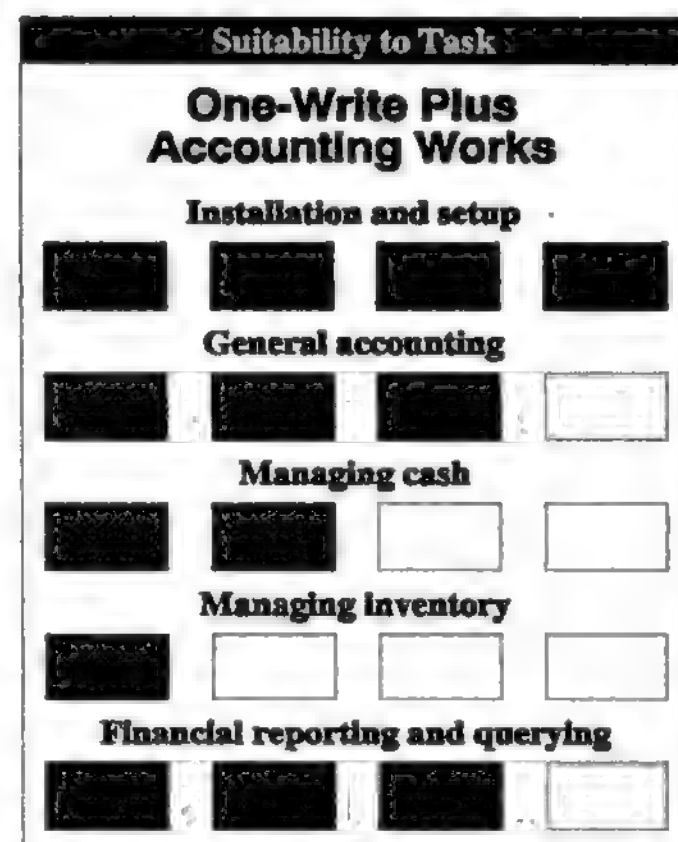
MINOR CAVEATS

Unfortunately, information from *One-Write Plus*'s A/P and A/R modules is posted to G/L in summary form rather than transaction by transaction, forcing you to go to the appropriate journals to find the details. Great American plans to change this in an upgrade that is scheduled to be available by the time you read this review.

One-Write Plus also has size limitations on some data. Most accounting packages are limited only by hard disk space. In contrast, *One-Write Plus* will only allow you to allocate invoices to 10 accounts, and you can retain only 500 open customer invoices in detail. If you exceed 500 items, you must compress the details into customer totals. Great American plans to relieve size limitations in future versions of *One-Write Plus Accounting Works*.

LOTS OF EXTRAS

The nonaccounting components of *Accounting Works* add lots of value to the total package. The *@Accounting* module links *One-Write Plus* with most popular spreadsheet packages, including *Lotus 1-2-3*, Versions 2.x and 3.x, *Quattro Pro*, and *Excel*, extracting data from OWP to create a wide variety of predesigned worksheets, such as forecasts, trends, cash flow and trial balance.



SuperTrack allows you to set up user-defined "cards" to track data for such things as inventory items, projects, or salespeople. All entries into the main accounting modules can be associated with *SuperTrack* cards, which can thus accumulate important management information. For example, you could track sales commissions by using *SuperTrack* cards to capture a salesperson's ID and commission percentage each time an order is entered into the system. Or create a card with an item code, a description, and the quantity on hand for each item in stock, and *SuperTrack* serves as an Inventory module. Keep in mind, however, that while *SuperTrack* can do things like automatically adjust quantity each time an item is sold, it is not an accounting module and does not make the appropriate journal entries.

The third useful tool included in *Accounting Works* is *Get Paid Plus*, a module that extracts and merges program data (like customer names and addresses) with over 100 standard form letters, including past due notices, credit approval forms, confidentiality agreements, and termination notices. This should speed communications with customers, and, especially, improve cash flow by automating the collection process.

If you're looking for an easy-to-use, basic accounting system to track receivables, payables, and payroll, and you don't have sophisticated inventory requirements, *One-Write Plus Accounting Works* should certainly be on your short list. Not only will *One-Write Plus* help prepare your account records, but *Accounting Works* should help make running your business a little easier.

FACT FILE

One-Write Plus Accounting Works

Great American Software Inc., A subsidiary of MECA Software Inc., 615 Amherst St., Nashua, NH 03063; 800-388-8000, 603-889-5400.

List Price: \$199.95.

Requires: 640K RAM, DOS 3.1 or later.

CIRCLE 483 ON READER SERVICE CARD

Pacioli 2000

by Raymond A. August

For little more than the price of a box of diskettes, *Pacioli 2000*, Version 1.06, from M-USA Business Systems, provides a complete accounting solution capable of automating a small business on either a LAN or a standalone PC. (The product name comes from Fr. Luca Pacioli, the Italian friar and friend of artist and sometime inventor Leonardo da Vinci, who is generally credited with the invention of the

SOFTWARE PRICE WATERHOUSE REPORT

double-entry accounting system.)

Don't be misled into thinking that the product's \$49.95 price indicates a lack of sophistication. *Pacioli 2000* includes fully integrated General Ledger, Accounts Receivable, Accounts Payable, Inventory Control, Billing, Purchasing, Budgeting, and Auditing modules—with a compatible Payroll module that is free to licensed users, \$32.50 to nonlicensed users. But plan on investing considerable sweat in learning your way around this bargain package. For one thing, *Pacioli* provides neither a tutorial nor any sample data, and it offers only a single chart of accounts, so setup is a difficult undertaking. According to M-USA, a new version of *Pacioli 2000* will be available shortly after you read this.

THE GOOD, THE BAD, AND THE UGLY

Pacioli is an odd mixture of both well- and not-so-well-thought-out features. Its simple, well-designed interface, for example, is easy enough to navigate through—with or without a mouse. On the other hand, most of *Pacioli's* data

entry screens are presented in debit/credit fashion, requiring users to have a pretty solid grounding in the concepts of double-entry accounting. *Pacioli's* Main menu choices are unconventional: File, Transaction, and Reports, rather than the more functional G/L, A/R, and A/P selections found in most other accounting software packages. While this may please accounting neophytes, veterans may require some

Suitability to Task

Pacioli 2000

Installation and setup

easy	moderate	difficult	
------	----------	-----------	--

General accounting

easy	moderate	difficult	
------	----------	-----------	--

Managing cash

easy	moderate	difficult	
------	----------	-----------	--

Managing inventory

easy	moderate	difficult	
------	----------	-----------	--

Financial reporting and querying

easy	moderate	difficult	
------	----------	-----------	--

Upgrade Today!

WORKSTATION MEMORY

from *ΣSigma Data* the Upgrade Specialists!

- ▲ IBM (RISC 6000) ▲ HP Apollo (9000 Series)
- ▲ Silicon Graphics (Indigo, 4D/Series)
- ▲ Data General(Aviion) ▲ Sun ▲ DEC ▲ NeXT

What makes Sigma Data the best source for quality **Kingston** memory products?

30-Day Money-Back Guarantee - Immediate Delivery - Lifetime Warranty

ΣSigma Data

P.O. Box 1790, New London, NH 03257
NH (603)526-6909 Fax: (603)526-6915

VISA, MC, AMEX, CUD & Qualified PO's accepted. All companies and/or products are trademarks and/or registered trademarks of their respective manufacturers

Call **800-446-4525** and profit from over 10 years of experience!

CIRCLE 180 ON READER SERVICE CARD

SOFTWARE
PRICE WATERHOUSE REPORT

minor retooling to adjust.

Further, rather than maintaining separate master files for accounts, customers, and vendors, *Pacioli* combines all three groups into a single chart of accounts. When you invoke an account lookup window, vendors and customers are sitting alongside your G/L account numbers, greatly increasing the volume of records that you must wade through to select the proper account. Furthermore, vendors and customers are subject to the same tight restrictions placed on G/L accounts: You cannot delete any vendor or customer that has had activity in the last 36 accounting periods (usually months), which forces you to maintain inactive accounts far too long.

Nonetheless, *Pacioli*'s well-written manual provides assistance in program operation, DOS, and general accounting. Lookup windows are provided wherever appropriate, and accounts, vendors, and customers can be added on the fly during data entry. The package's handy auditing feature assists in the reconciliation of any account balance. You can check off each transaction to indicate that it has been reviewed.

ONE SCREEN FITS ALL

Pacioli provides only one data entry screen for entering all purchasing, receiving, and sales transactions, and another for entering all new vendors, customers, and General Ledger accounts. Entries to these screens are made in debit/credit fashion; therefore, you need to know which is which.

This single-screen approach can cause considerable confusion for the inexperienced, because the purpose of certain data fields change depending on the type of data being entered. For example, the field titled "Your #" on the Transaction entry screen sometimes represents the vendor invoice number and other times represents the customer purchase order number. In addition, *Pacioli*

does not allow automatic reversal of journal entries, nor does it perform recurring entries in any module, both of which an up-to-date accounting package ought to handle. However, according to M-USA, *Pacioli*, Version 2, will add processing of recurring sales and purchase transactions.

ECLECTIC REPORTING

Pacioli's reporting is flexible and has some unusual twists. The G/L Report Writer provides above-average customization capability and numerous predefined reports to help you get started. It allows

complete definition of each row and up to 14 columns can be defined for each report. The Report Writer can draw data from any of the 36 periods *Pacioli* maintains. Most reports can be exported to a delimited file that can be read into your

*Don't be misled
into thinking
that Pacioli 2000's
low price indicates
a lack of
sophistication.*



Rub lamp and say:

"I want vivid color from an affordable printer."

"I want vivid color from an affordable printer."

"I want vivid color from an affordable printer."

If that doesn't work call 1-800-835-6100, Dept. 22E.

The Phaser™ II PXe color printer produces 16.7 million of the world's brightest, most vivid colors. It prints at 300 dpi onto transparencies or paper using PostScript Language-Level 2. It works with PC or Mac applications, it's fast, it's networkable and at \$4995, unexpectedly affordable. Rub for awhile, then call.

favorite spreadsheet or database.

In *Pacioli*'s streamlined fashion, Inventory, Receivable, and Payable reports are all selected from the same screen. You can sort, subtotal, and rank the data by many different variables. Still, an Aged Trail Balance is the only Receivable and Payable financial report available. *Pacioli* will not produce sales analysis or cash received reports.

A/R generates many useful nonfinancial reports such as invoices (for services or products) and packing lists. Inventory can maintain three price levels for each item, and product and service prices can be changed automatically, based on criteria such as quantity, vendor, and location. Users can select from five inventory valuation methods: Standard, LIFO, FIFO, Average, and Last Cost.

When it comes time to pay for these inventory items, *Pacioli*'s ability to print the same check number repeatedly may cause your auditors to flinch. Also, you'll find check selection inefficient, because it requires you to select the invoices you want one by one. It is one of the handful of packages that easily produces 1099 forms at year's end, though.

SOFTWARE PRICE WATERHOUSE REPORT

NETWORKING INCLUDED

Amazingly, considering its rock-bottom price, *Pacioli* comes ready to run on any Novell- or NetBIOS-compatible network, utilizing both file- and record-locking features. *Pacioli* even allows users to configure the appearance of their screens and attach this personalized screen description to their user IDs.

On the whole, *Pacioli 2000* is easier to use than some of its full-featured competitors, like *DacEasy* and *Peachtree Complete III*, but it will take some elbow grease—backed up by some serious accounting savvy—to get up and running. Once set up, however, *Pacioli* provides substantial functionality and a streamlined user interface that can help automate a wide variety of small businesses. If you've got the experience to handle it, *Pacioli 2000* is one of the most amazing software bargains around.

FACT FILE

***Pacioli 2000*, Version 1.06**

M-USA Business Systems Inc., 15806

Midway Rd., Dallas, TX 75244; 214-386-6100.

List Price: \$49.95.

Requires: 640K RAM, DOS 2.1 or later.

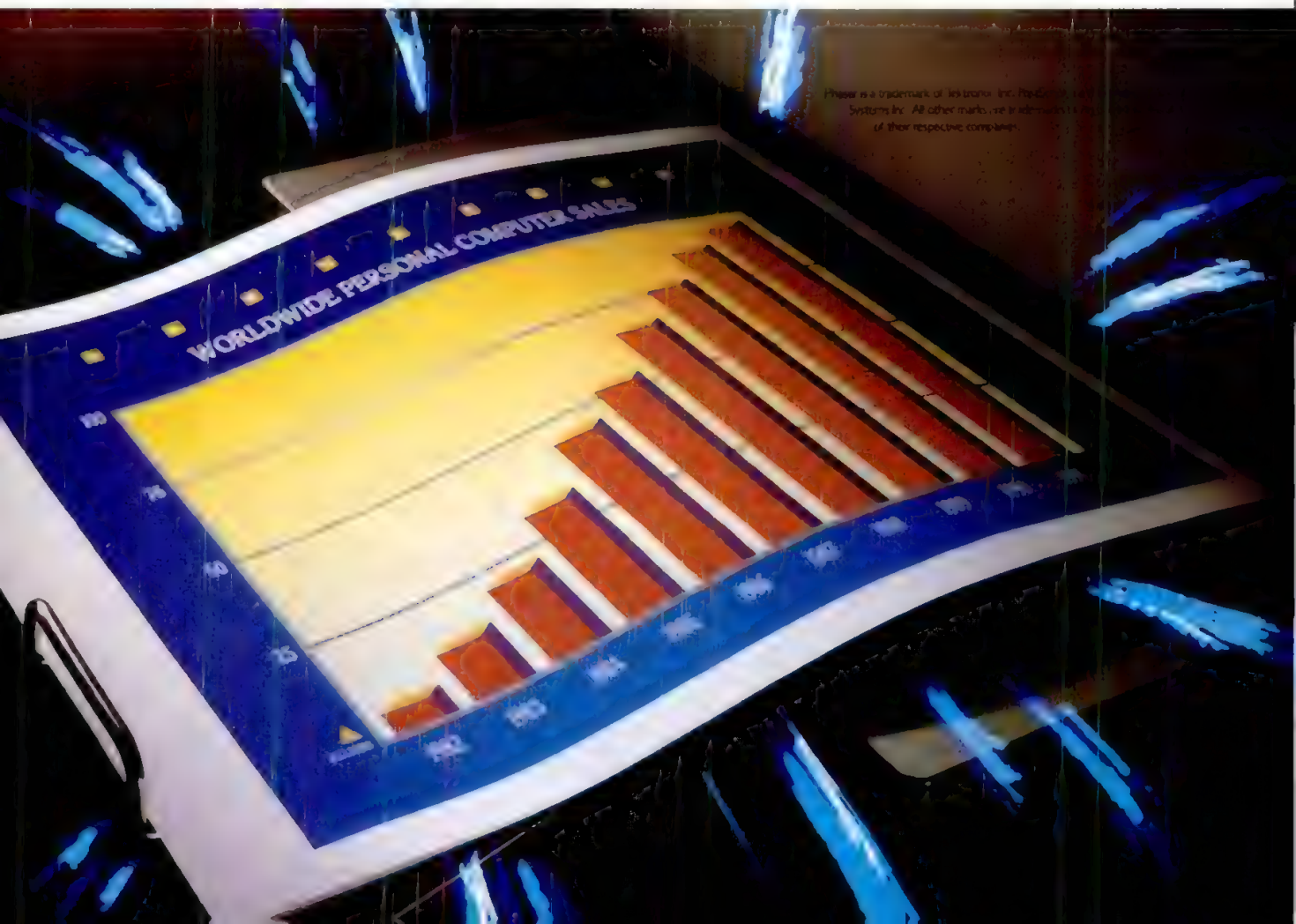
CIRCLE 484 ON READER SERVICE CARD

PC Accountant

by Raymond A. August

Occasionally, a relatively little-known product provides a pleasant surprise. Such is the case with *PC Accountant*, from PC Accountant, a \$295 product with an impressive feature set. The package is capable of managing multiple warehouses and processing Return Merchandise Authorizations (RMAs), and it offers many sophisticated pricing methods that should be especially useful to a distributor or any other inventory-intensive business. To accommodate multiuser environments, a LAN version of *PC Accountant* is available for an additional \$295.

Like *Manage: Complete*, *PC Accountant*



SOFTWARE
PRICE WATERHOUSE REPORT

Suitability to Task

PC Accountant

Installation and setup



General accounting



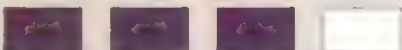
Managing cash



Managing inventory



Financial reporting and querying



PC Accountant is written in *FoxPro* and takes full advantage of this database management system. Data files are stored in the familiar *dBASE* .DBF format that *FoxPro* happens to use as well. The *FoxPro* Report Writer is utilized for report generation. This allows you to design unlimited custom reports and, in addition, customize all of the forms within *PC Accountant*.

LOOK AND FEEL

Data entry screens are intuitive and reasonably straightforward, but could use some sprucing up. *PC Accountant*'s on-line help is also useful, although it is found only at the screen level, not the field level. Key-strokes are not always consistent from screen to screen, and on-screen instructions could be clearer and more comprehensive.

INTEGRATION

PC Accountant's Purchase Order, Inventory, and Fixed Assets modules are all tightly integrated with the rest of the product. If you charge a user-specified range of fixed-asset accounts while entering a voucher, *PC Accountant* instantly prompts you for fixed-asset information, and that asset is automatically entered

into the fixed-asset module.

The accounting software package's G/L module works well in multicompartment organizations. Separate companies can be identified within the account number; information for multiple companies can be accumulated and maintained; and all reports, including financial statements, can be automatically printed in a consolidated format.

The inventory module picks up where Sales and A/R leave off. Product pricing can be determined by several different methods, including six

different price and discount levels, promotional pricing, or autopricing, which determines prices based on product cost plus a profit margin. Multiple warehouses and automatic creation of purchase orders based on a reorder quantity round off the list of *PC Accountant*'s Inventory module features.

PC Accountant's
modules are tightly
integrated with
the rest of the
product.

To get these qualities in a 16-bit ada

Wouldn't it be nice if you could slow your spending down while speeding your network up?

That's the spirit behind the new EtherLink II[®]/16 adapters. You'll find them a smart, frugal way to put 16-bit power onto your network.

The EtherLink II/16 family uses the same software drivers as the popular EtherLink II adapter, and they're based on the same proven technology. So you'll find installation easy. No fiddling with new software. No complicated adjustments to your network. Just plug in the EtherLink II/16 TP for twisted-pair or the EtherLink II/16 for coaxial, and you're up and running.

And if you are not among the 1.6 million people who already use EtherLink II, rest assured. Putting the new EtherLink II/16 family on your network for the first time



EtherLink II/16 TP
and EtherLink II/16 coaxial



Worry-Free. More than three million customers have proven the reliability of 3Com adapters. No other company has sold or installed as many adapters as 3Com.

Faithful. 3Com adapters will never let you down, no matter how complex your network becomes.



Performance. You can choose the right price/performance level for your network. No other company offers more types of Ethernet adapters.

SOFTWARE PRICE WATERHOUSE REPORT

DISTRIBUTORS' DREAM

PC Accountant excels as a package for distributors. Surprising features include credit-limit checking for each line of an order, comprehensive and complete RMA processing, unlimited sell-to and bill-to addressing, automatic processing of customer write-offs, and strong state sales tax processing and reporting.

Three types of user-defined collection letters can be accessed in the A/R module. Actual collection letters are printed based on the aging of past due receivables. In these difficult economic times, this feature will, undoubtedly, prove extremely useful.

If *PC Accountant* is guilty of anything, it's of presenting you with too much on-screen information. For example, at the Order Entry screen, you are automatically

shown a customer aging report and all open invoices. Although the information would be helpful under some circum-

stances, it represents overkill most of the time. Second, while *FoxPro's* Report Writer may be easy to use for a programmer, it can be confusing and frustrating for the computer novice or accounting professional. And allowing uncontrolled access to the *FoxPro* dot prompt, as *PC*

Accountant does, presents a significant control risk to the assurance of accounting data integrity.

If you need a full-featured solution to automate a distributorship or any other inventory-intensive business, *PC Account-*

ant, though a little rough around the edges, can provide a very capable solution at a strong value.

FACT FILE

PC Accountant

PC Accountant, P.O. Box 2278, Kirkland, WA 98083; 800-827-1303.

List Price: \$295.

Requires: 440K RAM, DOS 2.1 or later.

CIRCLE 485 ON READER SERVICE CARD

*If PC Accountant
is guilty of anything,
it's of presenting
you with too much
on-screen
information.*

pc/MRP

by Raymond A. August

pc/MRP, Version 4.3, a \$179 package from Software Arts Consulting, is a specialized product designed to meet the complex inventory needs of manufacturing operations. *pc/MRP* attempts to compete with high-end packages priced in excess of \$10,000. Its accounting functionality is suitable for companies with

pter, you'll have to spend a bit less.



Support. A 3Com reseller is never far from you. For the name of the nearest one, call 1-800-NET-3Com.



Compatibility. 3Com adapters are compatible with more software than any other. Especially the value-priced EtherLink II/16 family.

Lifetime warranty. You may never need our limited lifetime warranty. 3Com adapters last for 70 years or more.

takes less than five minutes. No other 16-bit adapters are compatible with more types of software than EtherLink II/16 TP or EtherLink II/16 coaxial. You can run them on NetWare, LAN Manager, Banyan VINES, UNIX and DEC Pathworks to name just a few. And they come with network management capabilities.

What's more, the EtherLink II/16 family is so reliable they're backed by a limited lifetime warranty.

But why not see for yourself? Call 1-800-NET-3Com for more information. Or visit your 3Com reseller. And see how you can get more by spending a little bit less.



©1992 3Com Corporation (408) 764-5000. 3Com and EtherLink are registered trademarks of 3Com Corporation. NetWare, Banyan, VINES, DEC, UNIX and Pathworks are trademarks of their respective owners.

CIRCLE 293 ON READER SERVICE CARD

Suitability to Task			
pc/MRP			
Installation and setup			
☐	☐	☐	☐
General accounting			
☐	☐	☐	☐
Managing cash			
☐	☐	☐	☐
Managing inventory			
☐	☐	☐	☐
Financial reporting and querying			
☐	☐	☐	☐

complex inventory requirements but less-than-sophisticated General Ledger or Accounts Payable processing needs.

pc/MRP contains the standard G/L, A/P, and Accounts Receivable modules as well as Partmaster (Inventory), Stockroom, Bill of Materials, Purchasing, and Invoicing. There's a 500-part limit in the Partmaster module of the base version of *pc/MRP*. If you need to maintain more than that, opt for the \$395 version, which can maintain a virtually unlimited list. A LAN version of the package costs \$695.

pc/MRP's interface needs some updating. It lacks basic amenities like lookup windows and on-the-fly updates of master data files. Transaction entry is performed one leg at a time, and on-line help could stand some improvement.

The no-frills G/L module offers users just one basic chart of accounts and is devoid of conveniences such as recurring or reversing transactions. The A/P and A/R modules are similarly unremarkable.

THE SPECIAL STUFF

pc/MRP's Purchasing Order module, on the other hand, is the most flexible and sophisticated we've seen in this review. For example, it allows you to specify a different delivery date and tax rate for each line on the purchase order. The module provides an abundance of reports, including listings by date, part number, vendor, contract, and requester. The package can even produce a suggested PO report, identifying items that need to be replenished.

The Sales Order module, too, is unusually flexible, allowing you, for example, to maintain a separate discount rate and multiple shipping addresses for each cus-

tomers. It also tracks the salesperson and commission on every sale. In a retail environment, *pc/MRP* can be configured with a cash draw and receipt printer.

Manufacturers use bills of materials (BOMs) to list the components of finished assemblies. With *pc/MRP*, you can create BOMs of unlimited complexity (an aid in designing complex products) and also duplicate BOMs for reediting (which speeds up the task of designing products with similar parts lists).

The Stockroom module provides a central control point for all inventory, tracking the increase and decrease of stock items closely. Partmaster tracks detailed information about individual parts, such as drawing number, size, and revision. The module prints part labels and, with a \$99 option, bar code labels.

pc/MRP definitely doesn't give you fancy screens or sophisticated accounting features, but if you are looking for an inexpensive way to help automate your manufacturing operation at the expense of some basic accounting functionality, consider *pc/MRP*.

FACT FILE

pc/MRP, Version 4.3

Software Arts Consulting, P.O. Box 3621, Santa Clara, CA 95051; 408-248-6445.

List Price: Small-business package, \$179; large-business package, \$395.

Requires: 640K RAM, DOS 3.3 or later.

CIRCLE 486 ON READER SERVICE CARD

Peachtree Complete III

by Suzanne Colvin

Peachtree Complete III, from Peachtree Software, lives up to its name, providing the most complete feature set of the packages in its price range. If you're looking for a good buy, *Peachtree*, priced at an amazingly low \$199, provides many features comparable to those included in packages costing thousands of dollars more, including many that we reviewed in our October 15, 1991, roundup of high-end accounting software packages.

Although *Peachtree*'s robust package

is certainly a bargain, a substantial investment of time is required to get the system up and running properly. Initial setup of *Peachtree* requires navigating through numerous screens to establish and define configuration and default information. The result, for those who are up to the challenge, however, is efficient and streamlined data entry.

Peachtree's complete documentation helps make this complex system installation straightforward and manageable. In addition to a DOS guide and an accounting guide, *Peachtree* provides separate manuals for each module, each containing a tutorial, reference section, start-up checklists, and data entry forms. Context-sensitive help screens thoroughly explain most, but not all, data entry fields.

A well-organized, intuitive main menu allows you to select the accounting module you wish to access, and the second-level menu identifies selections for "Maintenance," "Processing," or "Reports." Once familiar with *Peachtree*, you can eliminate the multilevel menu structure and access the "Classic" single-level *Peachtree* menu with one list of all options for each accounting module.

Peachtree incorporates many control features, including backup reports, audit-trail reports, and batch-control totals, to provide the assurance of accurate and complete data entry. Blessedly, *Peachtree* Software recognizes that these controls may be cumbersome and unnecessary for some small companies and lets users designate them as mandatory or optional.

ENTERING FIGURES

Peachtree requires several screens to enter data for a particular transaction. How-

Suitability to Task			
Peachtree Complete III			
Installation and setup			
☐	☐	☐	☐
General accounting			
☐	☐	☐	☐
Managing cash			
☐	☐	☐	☐
Managing inventory			
☐	☐	☐	☐
Financial reporting and querying			
☐	☐	☐	☐

ever, the ability to add General Ledger accounts, customers, vendors, and inventory items on the fly does help make navigation through these screens more efficient. *Peachtree's* G/L account number structure provides for a five- or six-digit number followed by a two-digit department identifier. This structure allows all *Peachtree* financial statements to be printed by department or in total.

Furthermore, the addition of a new department or profit center can be facilitated through the automatic replication of a similar department's account structure. Organizations with multiple companies or operating entities will find *Peachtree's* consolidation features quite useful. Two budget fields are provided for each account number—an important feature, since many companies utilize a static annual budget supplemented with a rolling forecast.

A/P is capable and powerful. Standard features include duplicate invoice checking, automatic printing of checks for currently due invoices, printing capabilities for 1099s, and a fully integrated Purchase Order module. Unfortunately, vendor payment terms cannot be recorded in the master vendor file and, therefore, must be entered for every voucher—an inefficient and repetitive process.

PEACHTREE'S FORTES

Sales invoicing and inventory rank as *Peachtree's* specialties. It can identify, accumulate, and track typical inventory items, nonstocked parts, services and "kits," or single-level bills of materials. More important, *Peachtree Complete* can establish minimum reorder points for inventory items to help replenish inventory stock efficiently.

If your business requires tracking of serialized inventory, *Peachtree* could be your answer. With a feature normally reserved for higher-priced packages, *Peachtree* tracks inventory serial numbers. Serialized inventory information can be accumulated and maintained for an unlimited period after the sale. Serial-number aging reports can be printed to assist in the identification and evaluation of slow-moving or obsolete inventory.

*Sales invoicing
and inventory rank
as Peachtree's
specialties.*

ALSO AVAILABLE

Peachtree offers a wider range of standard financial reports than any of its competition. For example, *Peachtree*

Complete III includes all the basic master file lists and activity report agings, as well as Sales Analysis and Inventory Activity reports.

Even so, a greater variety of standard reports are available. You will need to purchase

Peachtree Data Query III to enhance the flexibility of report design. This package facilitates the creation of an unlimited number of custom reports. These reports can be incorporated with the standard module menus for easy and efficient access.

Peachtree Complete's separate Fixed Assets module tracks three different depreciation methods, automatically generates depreciation entries for General Ledger posting, and includes book-versus-tax-depreciation comparison schedules to assist in the preparation of tax returns.

Other modules include Job Cost and Payroll. If your accounting needs are not all that "complete," and you can live without the Purchase Order, Fixed Asset, Job Cost, and Payroll modules, *Peachtree III-Basic* costs only \$99. A separate Bank Reconciliation module, *Bank Account Manager*, can be purchased for \$79, and the "Double Bonus Bundle," which includes *Peachtree Complete III* and *Peachtree Data Query III*, costs \$298. As a bonus, *Peachtree* modules can function on a standalone basis, allowing installation of only those modules that are required or of interest. The *Peachtree* package is also available in a LAN environment version for \$695.

If you're looking for a sophisticated and integrated accounting package at a low price, strongly consider *Peachtree Complete III*. While getting the system up and running requires the investment of sweat equity, if you have complex requirements and reasonably accounting- and computer-literate individuals to coordinate the installation process, it will be well worth the effort.

FACT FILE

Peachtree Complete III

Peachtree Software, 1505 Pavilion Pl., Norcross, GA 30093; 800-247-3224, 404-564-5888.

List Price: \$199.

Requires: 640K RAM, DOS 3.0 or later.

CIRCLE 487 ON READER SERVICE CARD

Takin' Care of Business

by Raymond A. August

With eight separate modules, Hooper International's *Takin' Care of Business*, Version 2.0a, priced at \$299.95, offers a good balance of functionality and ease of use for companies with fairly basic business-accounting requirements. An even more basic five-module set that includes General Ledger, Accounts Payable, Accounts Receivable, Financial Utilities, and Bank Reconciliation is available for a thrifty \$149.95. LAN users can purchase *Takin' Care of Business* for \$399.95 and existing users can upgrade to the LAN version for \$149.

An appealing interface makes navigating through *Takin' Care of Business* straightforward and intuitive. Clear documentation and concise, context-sensitive help get you up and running in a hurry. The included accounting tutorial is well written and insightful. *TCOB* falls down somewhat, though, in offering only one sample chart of accounts (provided with the sample company) or the option of

Suitability to Task

Takin' Care of Business

Installation and setup



General accounting



Managing cash



Managing inventory



Financial reporting and querying



CORRECTION

Desktop Direct from Digital regrets that an inaccurate photograph accompanies their 420sx bundle configuration: Package No. DJ-PC445-09 in their ad appearing in this issue.

The copy for that product configuration describes the monitor and base system accurately.

digital™

SOFTWARE

PRICE WATERHOUSE REPORT

building your own from scratch.

TCoB's G/L is simple and easy to use. Posting to the G/L is done only in batch, however, while posting between all other modules is processed on-line, which provides more timely financial information. *TCoB* doesn't close periods; therefore, transactions can be posted to any accounting period at any time. Since it's not uncommon for master file identifiers to change, *TCoB* allows you to change the account, vendor, customer, and inventory numbers even if there is activity against that account so you can get the system up and running today and worry about these matters at a more appropriate time. The G/L can also help you create bar, line, or pie graphs quickly; and accounts can be flagged as active or inactive. The latter restricts access to those accounts that shouldn't be deleted because of financial activity in a prior period.

A full-featured A/P module has numerous and comprehensive reporting abilities. Entering data into A/P, however, will require some accounting orientation since the voucher screen looks like a G/L journal entry, with debits equaling credits. *TCoB's* Financial Utilities module includes many handy calculations, including depreciation, loan payments, and bond analysis. *TCoB* also offers a fully integrated Payroll module.

POP EASE

All *TCoB* modules and fields offer pop-up windows, so master file records, such as vendors and account numbers, can be entered on the fly. Numerous check-selection strategies are available, and it is simple to pay an invoice partially, a real challenge in most systems. *TCoB* effortlessly sets up recurring transactions, such as lease payments. Transactions can automatically repeat on a weekly, biweekly, semimonthly, or monthly basis.

MISNOMER AND MISSTEPS

Hooper calls *TCoB's* Invoicing module Point of Sale, which is a bit overstated since its only point-of-sale feature is accepting cash sales. Invoices can be prepared for stocked and nonstocked items or service entities, such as hours worked. Inventory items can have up to four price levels, and discounts can be issued by customer. Unfortunately, calculations for sales tax are for only one jurisdiction and sales tax reporting is very limited.

TCoB does not let you customize financial reports or process reversing transactions. It has no support for backordering inventory, and its handling of cash receipts can prove cumbersome. You need to know what invoice the cash goes with, since the software doesn't provide a list of open invoices. You log cash receipts in a journal-type screen, entering both the debit and credit. Oddly, *TCoB* does not store a default cash account.

TCoB loads into RAM all account numbers and any other information (for example, vendor numbers for A/P) that each module requires. Consequently, moving from module to module can be slow. If you require a large number of accounts, customers, vendors, or items, you may be thankful for *TCoB's* ability to access expanded memory.

PARADOX CONNECTION

If you are converting from another software format, all modules allow for importation of data. *Paradox* and *ObjectVision* programmers will be pleased to note that *TCoB* stores its data in a *Paradox* file format. They will be able to write *Paradox* applications utilizing *Takin' Care of Business* data.

All things considered, *Takin' Care of Business* provides a solid, easy-to-use solution for any small company that doesn't have complex financial-reporting requirements. If you need to take care of your business in a hurry, take a look at *Takin' Care of Business*.

FACT FILE

Takin' Care of Business, Version 2.0a

Hooper International Inc., P.O. Box 50200, Colorado Springs, CO 80949; 800-245-7789.

List Price: \$149.95; deluxe package, \$299.95.

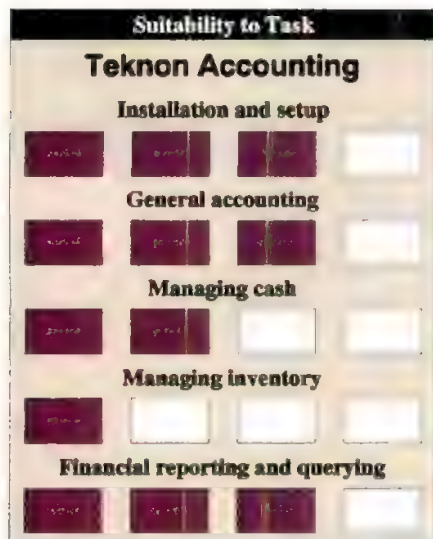
Requires: 640K, DOS 4.0 or later.

CIRCLE 488 ON READER SERVICE CARD

Teknon Accounting

by Thomas White

If you want a GUI-based accounting system without having to run Microsoft Windows, try *Teknon Accounting, Version 1.03*. This \$249 package from Teknon



Corp. has been ported over from the Macintosh. Rather than conforming to Windows conventions, this accounting software package looks and acts just like Mac software.

Teknon has a fairly standard accounting-package cadre of modules—General Ledger (G/L), Accounts Payable (A/P), Accounts Receivable (A/R), and Payroll—but *Teknon* goes beyond the norm in user

assistance. The package makes a concerted effort to help you through setup with thorough, well-indexed documentation. In addition, 13 sample charts of accounts are provided, addressing a wide range of small businesses from travel to floral. *Teknon*'s on-line help even provides an overview of the tasks you will need to perform when starting up a new company.

An unusual A/P feature allows you to decide whether you'll still honor discounts turned in after the cut-off date—a standard practice in some industries. *Teknon* can format checks, invoices, statements, and W2 forms to your needs, but a Windows product would provide better font and printer control.

Teknon's Accounts Receivable module has some extra features, including the ability to accept cash receipts on account and the ability to tag disputed invoices. The package also provides a mini-item file for inventory tracking that stores the item name, price, and unit of measure. Because quantities and costs are not maintained, companies that require inventory

capabilities may find this inadequate.

If your reporting needs include the ability to print data by divisions and departments, you can assign a leading and trailing digit to your account number. *Teknon* includes a powerful financial Report Writer, but it will take some time to get used to before you can use it to crank out financial statements. Fortunately, *Teknon* provides several ready-made financial statement formats.

If you're a former Macintosh user who craves the Mac look and feel in your PC accounting software, take a look at *Teknon Accounting* or *M.Y.O.B.* *Teknon* is more Mac-like, but it's a long way from matching the features of *M.Y.O.B.*, particularly in inventory. ■

FACT FILE

***Teknon Accounting*, Version 1.03**

Teknon Corp., 8603 E. Royal Palm Rd., Scottsdale, AZ 85258; 602-596-1500.

List Price: \$249.

Requires: 640K RAM, DOS 3.3 or later, Microsoft-compatible mouse.

CIRCLE 489 ON READER SERVICE CARD



Your Passport to Translation!

The Language Assistant Series From MicroTac Software.

Translating text is fast and easy with the Language Assistant Series: Spanish Assistant, French Assistant, German Assistant and Italian Assistant

The Language Assistants translate simple English documents by analyzing individual sentences. They translate words, search for phrases, conjugate verbs, provide gender and number agreement, and work with word order.

The Language Assistants instantly give you the power to communicate basic concepts in a foreign language, and provide a foundation for more advanced communication.

- ▶ Helps you translate and write while improving your foreign language skills
- ▶ Pop up help with powerful reference tools

- ▶ Easily add foreign and accented characters
- ▶ Plus: On-line bilingual dictionaries, verb conjugator, grammar help topics, and more!

Only \$79.95—Order Now!

Give your PC bilingual power with Spanish Assistant, French Assistant, German Assistant and Italian Assistant. 30 day money-back guarantee.

See Your Software Dealer or Call:
(800) 366-4170



MICROTAC SOFTWARE

4655 Cass St., Suite 214, San Diego, CA 92109
800.366.4170 • 619.272.5700 • Fax: 619.272.9734

System Requirements: IBM compatible PC, DOS 3.3 or above, 512K RAM, and a hard disk.

CIRCLE 013 ON READER SERVICE CARD

Even I, Mr. Magoo, Can See The Advantages Of This New 17" Color Monitor.



According to Mr. Magoo, most monitors are little bitty things. Can't see 'em at all.

But Samtron's newest color monitor is an eye-opening 17" (13.6" wide, 10.22" high). Enough screen even for his feeble vision.

Which also makes it just the thing for you, if you want to peer at lots of Windows.[™] Or spreadsheets. Or pages of text.

Finer .26mm Dot Pitch.

The screen is not only bigger, its dot pitch is smaller. Honed to a fine 0.26mm. Together with 1,024 x 768 resolution, that means a far sharper picture. More visible details. With less flickering edges where colors meet.

What's more it's built with Samtron's non-interlaced, flicker free technology.



Left. We've moved the 3 dots that make color pixels closer together. Resulting in displays with crisper edges, finer details. **Middle.** Our smaller dot pitch lessens jaggedness and 'fluttering' where two different colors come together. **Right.** Without Samtron's finer details, letters fit in sharp corners become rounded, small type loses legibility as on right.

SAMTRON

WE'RE WORTH WATCHING

14251 E. Firestone Blvd., Suite 101, La Mirada, CA 90638

Phone (310) 802-8425

CIRCLE 296 ON READER SERVICE CARD

Sophisticated Flat-Screen.

Magoo also likes the fact that the screen is flat. And the corners square. So there's less distortion near the edges, more of the screen that's usable.

Big Screen, Small Size.

Amazingly, this much monitor comes in a very small package. It's only 16" high by 16.8" deep by 16" wide. And with Samtron's automatic degaussing coil, Magoo gets a perfect picture just by turning on the system.

But of all the things Mr. Magoo likes about our new 17" color monitor, its best feature is something he can't see.

The reliability of the Samtron name.

PERSONAL PUBLISHING Comes of Age

No longer the poor man's PageMaker, today's entry-level desktop publishing software proves the ideal solution for a variety of personal and small-business publishing needs.



PHOTOGRAPHY: THOM O'CONNOR

Five Low-Cost DTP Programs

By Luisa Simone

Low-end desktop publishing is dead: Long live entry-level desktop publishing. It may seem like a trivial difference, but the truth is that low-end DTP no longer adequately describes the products in this category.

Just a few years ago, "low end" was a more-than-accurate way to identify DTP products like *PFS:First Publisher*. Geared toward dot matrix output, *First Publisher* and its competitors relied on proprietary bitmapped fonts in fixed point sizes, low-resolution (72-dot-per-inch) pictures in a

GRAPHICS LOW-COST DTP

proprietary format, and a strictly linear text flow. "Low-end" was synonymous with limited functionality.

In comparison, the five products reviewed here—*Avagio*, *Express Publisher*, *Microsoft Publisher*, *PagePlus*, and *Publish-It!*—seem positively high end. They all perform competently in the essential areas of desktop publishing: text formatting, graphics handling, layout creation, and printing. The programs were chosen because they provide text support in the form of scalable fonts and import filters for standard word processors. (Although *Publish-It!* provides scalable fonts, it uses the loosest definition possible of *scalable*. In truth, you must use a utility called *Typographica* to generate bitmapped fonts from the supplied font outlines.) Though the exact file formats may vary, each of the programs can handle high-resolution bitmapped or vector images. They all allow you to create complex layouts by automatically wrapping text around pictures, linking text frames to one another, and jumping stories to noncontiguous pages. And all offer true laser printer support.

During the past few years, the one constant among the programs has been the prices—from \$150 to \$250 retail, with street prices below \$100. Price must be recognized as one of the driving forces in this market: Consider that Aldus Corp.'s *PageMaker* and Ventura Software's *Ventura Publisher* both cost \$795. That's a difference of over \$500. While graphical word processors like Lotus Development Corp.'s *Ami Pro* and Microsoft Word for Windows are capable of many desktop publishing tasks and can sometimes be found for similar prices, their text-based orientation makes them less suited for some page layout tasks (see the sidebar "When a Word Processor Will Do").

THE HIGH ROAD

Don't misunderstand: None of the programs in this roundup is intended to compete directly with *PageMaker* or *Ventura Publisher*. For example, both *PageMaker* and *Ventura* provide extremely sophisticated typographic controls, such as the ability to adjust point size, leading (the space between lines of text), and kerning (the space between characters) in extremely fine increments. Both programs allow you to create complex paragraph styles for automated text formatting. And both programs give you powerful management tools for long

documents, such as the ability to link multiple chapters into a book or to create a multilevel index automatically.

And while several of the low-cost products on the market can import color pictures and even assign custom colors to selected objects, only the truly high-end products like *PageMaker* and *Ventura* provide production-oriented color functions. For example, both *PageMaker* and *Ventura* can generate two-color separations, a process that places all black ele-

ments on one printout, and all the spot color elements (single-instance colors that are not created from cyan, magenta, yellow, and black dot patterns) on a second printout. This is called *spot-color overlay*. In addition, *Ventura* has moved toward full-color capability where continuous-tone color photographs can be translated into CMYK halftones.

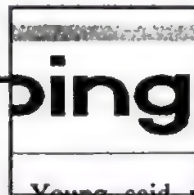
All these are essential functions for professional design and corporate workgroup publishers. Studies have shown, however, that most individual users—at home, in small businesses, and

FIT TO PRINT

To test these entry-level DTP packages, we designed a four-page newsletter composed of elements that we felt the products should be able to handle relatively painlessly. These included a variety of imported graphics file formats, both vector and bitmap; 30 percent gray tints; embedded rules; different point sizes and spacings for the type; a table; a bullet list; running headers and footers with automatic page numbering; rotated,

compressed, and expanded text; irregular text wrapped around a graphic; mixed column widths on a single page; and a two-page spread. We also embedded a few misspelled words to check each package's spell-checker.

All of the packages could create these elements, but did so with varying degrees of facility and quality, as described in the reviews and demonstrated in the accompanying output samples.



WordArt, the type-effects module bundled with *Microsoft Publisher*, can only manipulate the proprietary, low-quality font outlines that come with it. Notice that the characters are composed of straight lines rather than curves.

Microsoft Publisher produced the best, albeit not quite perfect, output. Some of the effects, such as the knockout type on this page, must be created using WordArt.

ense of style
the brushed
at the firm
and Coal at
rters. As it
bu

While fitting the text to the layout was relatively easy in *Avagio*, the quality of Micrologie's typefaces left something to be desired. For instance, it's almost impossible to tell that the typeface used in the first story is a compressed version of the face used in the second.

Overall, *Avagio* produced attractive output with excellent reproduction quality on the gray-scale images.



even within corporations—regularly use less than 50 percent of the functions offered by *PageMaker* and *Ventura*.

This raises the essential question: Why pay for features that you never use? For example, unless you are a professional designer, it is unlikely that you will ever need to specify a type size in increments of $\frac{1}{10}$ of a point (which translates to .0013 inch), or adjust kerning by $\frac{1}{100}$ of an Em (a square whose sides are equal to the current typeface's point size). For most publishing projects, the half-point and quarter-point increments offered by the

low-cost products are more than sufficient.

A LEARNING EXPERIENCE

The real surprise is that low-cost, entry-level desktop publishing programs are not merely subsets of more expensive products. In fact, by targeting the novice designer, these desktop publishing programs provide functions that are conspicuously absent from both *PageMaker* and *Ventura*.

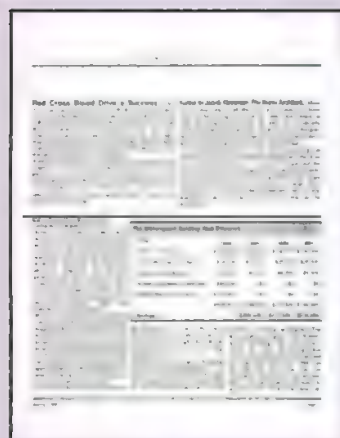
In addition, the programs in this roundup try to add value in unique ways, such as providing text effects. But the biggest selling point for all of the products reviewed here remains ease of use. All the programs try to flatten the learning curve for beginning designers, but each one takes a different tack. Toward this end, *PageMaker* has added templates, while *Ventura* now bundles clip art, two big selling points of the entry-level programs. *Microsoft Publisher* may have the most innovative approach for novice designers; it ships with a number of programs called *PageWizards*, which basically work like very smart macros. They ask you simple questions and then use your answers to design standard documents automatically. You can create business forms, newsletters, and brochures as well as special design elements like drop caps and coupons. (For some tips on creating more attractive layouts, see the sidebar "Newsletter Design 101.")

THE WINDOWS ADVANTAGE

But the really hot news for entry-level DTP is the migration to Windows. While this story covers only two Windows-based products, *Microsoft Publisher* and *PagePlus*, Windows versions of *Express Publisher*, *Publish-It!*, and the granddaddy of entry-level DTP programs, *PFS: First Publisher*, will soon be available.

Basically, the advantages offered by the Windows environment are just too good to pass up. Running under Windows means that a desktop publishing program can take advantage of standardized and robust printer drivers. In addition, both *PagePlus* and *Microsoft Publisher* have access to other Windows-based third-party utilities, such as *Adobe Type Manager*, *Adobe TypeAlign*, and *Bitstream's FaceLift for Windows*, which let you scale fonts on the fly for both the screen and the printer and create high-quality text effects. *Microsoft Publisher* also takes advantage of object linking and embedding (OLE), a Windows specification that allows you to link external files to a publication for automatic updates and to sublaunch OLE-capable applications from within *Publisher*.

Many of the products that move to Windows try to maintain a certain amount of consistency between the DOS-based and Windows-based products, in order to make long-time users feel comfortable and to provide a logical migration path. For example, *PFS: Publisher for Windows*,



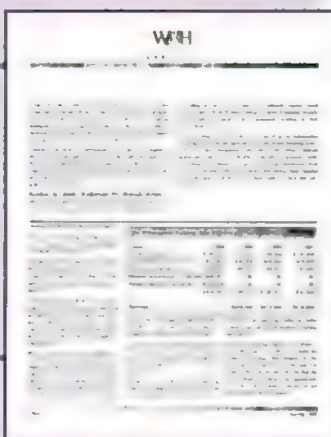
\$0	
\$199,000	\$2
\$209,000	\$21

PagePlus's lack of tabs made aligning the entries in this table of numbers an especially tricky proposition.

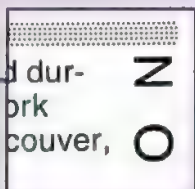
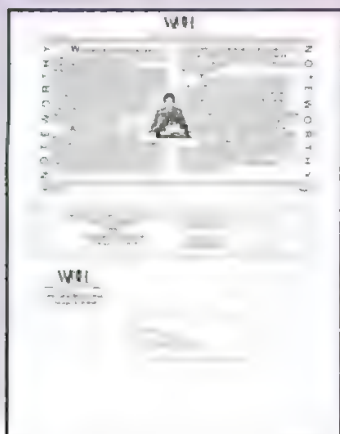
Between its excellent typographical controls and use of Windows' robust printer driver, you can certainly produce attractive output using *PagePlus*.

Publish-It!'s excellent tab controls made producing the table a snap. On the other hand, its lack of drawing tools, difficulty in aligning objects, and a not-terribly-WYSIWYG display made creating an attractive frame for the table nearly impossible.

\$0	
\$0	
\$199,000	\$19
\$209,000	\$21



The restriction imposed by fixed-size bitmap fonts made fitting the text to the allotted space difficult in *Publish-It!*



from the poor way this program handles its bitmap fills.

This page illustrates two of *Express Publisher's* strengths: its abilities to perform an irregular text wrap and to rotate text and justify it within a bounding box.

To create a gray tint in *Express Publisher*, you must use the *TextEffects* module or live with dither patterns. If you resize the element, bizarre banding results

NEWSLETTER DESIGN 101

by Barrie Sosinsky

Desktop publishing (DTP) is a demanding practice with its own specialized language. Above and beyond simply creating the text and art elements that comprise a piece, DTP requires a combination of typesetting, graphic design, and production skills. Two books that can help you learn the basic ground rules are James Felici's *The Desktop Style Guide* (\$11.95; Bantam Books, 1991) and David Collier's *Desktop Typography* (\$16.25; Addison-Wesley Publishing Co., 1991).

The overall objectives of good design are to create interest in the material, enhance readability, and get your message across. What you see when first looking at a page is its "color," the general look or feel of the page. Color is largely determined by the overall design of a page, the amount of white space, and the kinds of type used.

A page's color is important because it determines not only *if* your publication gets read, but also *how* it gets read. For instance, the largest elements of the page—headlines, large pictures, graphics, and so on—tend to draw the reader's eyes first. Latin language readers habitually scan pages from left to right and from top to bottom, with the eye inclined to follow the diagonal of a page. You can harness this natural flow to direct your reader's attention, or break the flow to add contrast to your publication.

GRIDLOCK

The pages of a publication are editorially related to each other and need to be designed with an overriding concept in mind. Hanging your elements on an underlying nonprinting grid is a good way to achieve consistency and to develop this design concept.

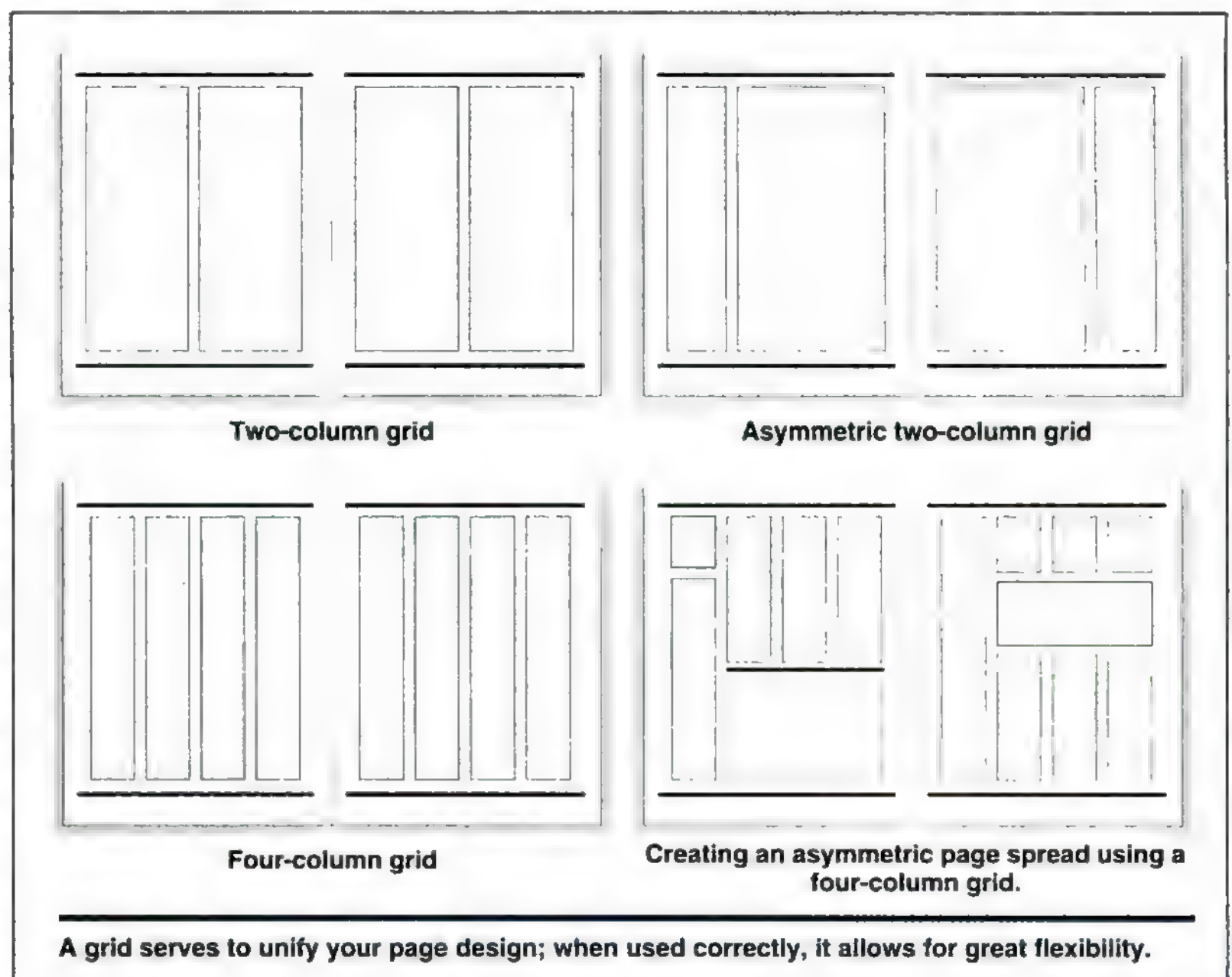
A grid can be as simple as a single column for small pieces or up to six columns for newspapers. Since illustrations, rules (lines), and other design elements can span two or more columns, grids need not limit your creativity. In a good design, it should be impossible to even discern that you used a grid.

Most page-layout programs allow you to enforce your grid via master pages, a special type of template containing specifications for repeated elements. Some elements of a master page (such as rules, page numbers, headers, and footers) appear on the printed page, while others (such as column grids and guide lines) appear only on the layout and are used for

page) to move the reader's eyes along. Also try shaded boxes of text or quotations in large type (known as callouts) to liven up a page.

To plan your design, sketch out your page grids using filled boxes to simulate pictures, lines for rules, and boxes with broken lines for text. Look at your model from a distance. Is the page or spread interesting? Do the major elements of the page stand out? How do your eyes move about the page? If the pages work well, they will immediately direct your attention to the page's centerpiece: a title, a central graphic, whatever.

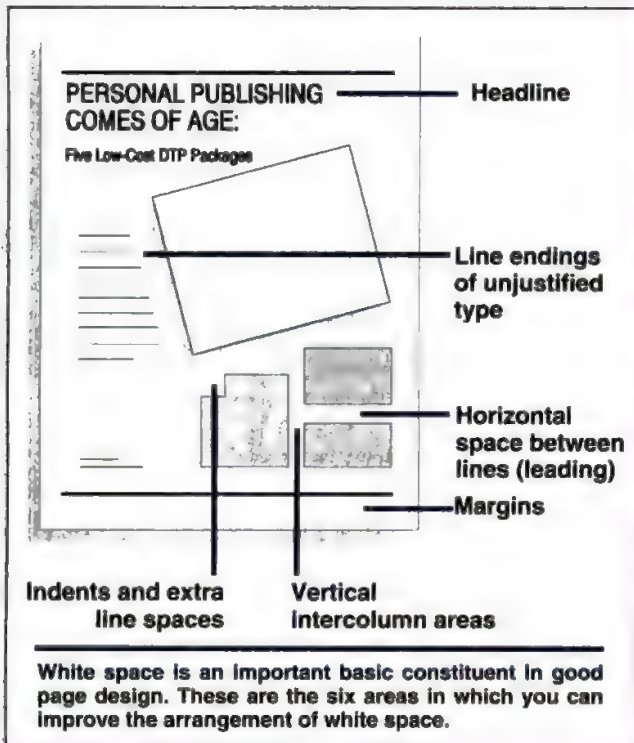
If you need inspiration, start by looking for examples of the genre you're



placement and positioning.

You needn't feel compelled to follow the grid: Every so often do the unexpected to increase a reader's interest. For example, use a graphics element that spans a page spread, or one that *bleeds* (extends past the margin to the edge of a

trying to create. Ronnie Shushan and Don Wright's *Desktop Publishing by Design* (\$29.95; Microsoft Press, 1992) and Roger C. Parker's *Looking Good in Print*, 2nd Ed. (\$23.95; Ventana Press, 1991) are two design sources that are heavily laced with good examples.



WHITE SPACE

It may surprise you to learn that nearly half of a well-designed page is white space. If you don't believe it, try cutting up a page's margins and text and weighing both sets of pieces on a balance. A well-designed page makes good use of white space and doesn't try to overwhelm the reader.

There are many techniques for creating white space. One approach is to increase the margins and intercolumn spacing. You can use an extra band of white space above your headline (called a *sink*) to draw attention to that headline or create vertical white space by placing callouts, a table of contents, or summary information in an otherwise empty column.

Rules, lines that emphasize elements of a page, can also help manage white space. As a general principle, use thick rules to lower the perception of white space, and thin rules when your page contains a lot of copy. Try experimenting not only with the width and placement of rules, but with their color—

sizes, weights, and styles for a particular typeface) on a page—using more may give your piece that “ransom note” look. When buying and collecting type, buy by families (typefaces in different weights—normal, bold, black, and so forth), so that you can use the same family of type on a page to achieve diversity.

Since sans serif type is larger and more open, it is often used for headlines. These sans serif faces (such as Helvetica) are less efficient than serif faces (such as Times Roman or Palatino) for maximizing the number of words on a page. Serif type is more often used for body copy, because the little flourishes on the letterforms lead the reader's eyes along and give those eyes unnoticed but necessary relief on long stretches of text.

shades of gray or spot colors are very effective in modifying white space. Use closeness to relate items to each other, and space to separate them.

WHAT'S YOUR TYPE

Choosing type is an artistic decision, so there are few rights and wrongs. But keep in mind that the typefaces you choose can determine the color of your page, the amount of text you can fit on it, and how easy it is to read.

The most important overall principle is that of restraint. Use only one or two fonts (the set of all

Once you pick your type style, use it consistently across similar elements; for instance, use the same style for all captions. This will help readers easily identify particular pieces while browsing your newsletter.

Type is a more complex subject than we can adequately address in this space. *How to Get Great Type Out of Your Computer* by James Felici (\$22.95; North Light Books, 1992) can give you ideas and tips. In addition, type vendors—Adobe Systems, Agfa Corp., Bitstream, and others—publish a portfolio of their type that you can usually get for free. If you are a novice at selecting type, consider buying type packages designed for a specific purpose. Adobe Systems sells a variety of Adobe Type Set packages (\$149 each; Mountain View, California; 800-833-6687) that are geared to a single purpose. You can also find comparative reviews of the various type libraries and delivery media in “Beyond Times and Helvetica: Scalable Fonts for the PC” in the September 24, 1991, issue of *PC Magazine*.

Leading

These lines are 18-point type on 18 point leading

These lines are 18-point type on 18 point leading

Tracking

This line has tight tracking

This line has normal tracking

This line has loose tracking

Kerning

AV AV (The right character pair is kerned for better visual effect)

Good layout software lets you make fine adjustments to all spacing parameters.

the Windows version of *First Publisher*, will continue to offer its extensive template gallery, where you can scroll through a visual library of page layouts.

In order to take advantage of the benefits offered by Windows, however, DOS-based programs like *First Publisher* must also change dramatically. So where the old version of *First Publisher* required

We were surprised
at the sophistication
of entry-level desktop
publishing packages.

you to work on separate layers that effectively segregated text from pictures, the new product allows you to draw text and picture frames side by side. In addition, the old restriction of a linear text flow has been replaced by the ability to link text frames and flow copy to noncontiguous columns or pages.

GRAPHICS

LOW-COST DTP

We had the chance to work with an early beta version of *PFS: Publisher for Windows* and found the feature set and implementation of the Windows product to be far superior to the old DOS version. A brief list of the new features includes: sophisticated paragraph formats, a group command to organize multiple objects, automatic drop caps, an indexing function, table of contents generation; it also has the ability to save complex type specifications as named styles. Software Publishing Corp. also promises that the product will support the OLE protocol, enabling you to link your desktop publishing documents to other programs like *Microsoft Excel* or *Works for Windows*. You can even customize the interface by placing icons of frequently used functions—such as copy, paste, and print—into a floating toolbox.

The good news for those users who have not yet upgraded to Windows is that they may never have to; *Express Publisher*, for example, supplies many Windows-like features, including on-the-fly scalable fonts from a well-known type manufacturer, Agfa Corp. In addition,

OUR CONTRIBUTORS

Luisa Simone is a contributing editor to *PC Magazine*.

James Karney is a computer and information systems consultant based in Clinton, Tennessee.

Barrie Sosinsky is the author of *Beyond The Desktop: Tools and Technology for Computer Publishing* (Bantam Books, 1991).

Express Publisher's menus and dialog boxes, which are CUA (Common User Access) compliant, work in much the same way as the menus and dialog boxes in Windows.

GETTING PERSONAL

In general, we were surprised at the increasing sophistication of entry-level desktop publishing programs. None of the programs had much difficulty re-creating the layout of our sample newsletter. (For examples of the output, see the sidebar "Fit to Print.")

Each product takes a very personal



EDITORS' CHOICE

■ Microsoft Publisher

All the personal publishing packages in this roundup performed admirably, but superior output quality, an easy-to-use interface, and a well-rounded set of features make *Microsoft Publisher* the package to buy for the majority of your needs. Its innovative PageWizards simplify and automate the creation of personal and business publications as well as special design elements, and its flawed-but-adequate WordArt module allows you to perform a variety of jazzy text effects. Although it needs to catch up with competitors like *Avagio*, *Express Publisher*, and *Publish-It!* by incorporating named paragraph styles into its documents, *Microsoft Publisher* clearly outclasses the crowd.

The other Windows-based product in this roundup, Serif's *PagePlus*, combines *PageMaker's* tried-and-trusted pasteboard with a well-

designed, easy-to-use interface. The package also has some great picture-handling features, including the ability to create irregular text wraps. But its lack of paragraph indents, stylesheets, tabs, and inexplicable printing artifacts are all simply unacceptable in a desktop product.

Staunch DOS users have a tougher decision, because the three DOS-based packages tend to be more eccentric than most. Unison World Software's *Avagio* has the hardest interface to learn and use, and imports only a single, proprietary vector file format instead of industry-standard formats like CGM and EPS. But it did produce the best-looking newsletter of the three and delivers drawing tools that go far beyond the capabilities of most DTP packages. You can draw and edit both regular and irregular polygons, and the admittedly idiosyncratic Mingle feature allows

you to create interesting effects of positive and negative space by overlapping text and picture elements.

Power Up Software Corp.'s *Express Publisher* is easy to use and includes a module that lets you create special text effects; unfortunately, it also imports too few graphics formats and produces not-terribly-great-looking output. Timeworks' *Publish-It!* runs under GEM and employs Ventura-like frames and paragraph styles, and its layout guides help design your publication. But because of its use of pseudo-scalable fonts, it's very difficult to fine-tune the appearance and spacing of your text without generating font bitmaps in every size, a huge waste of disk space. And *Publish-It!'s* dithering algorithms result in unattractive and annoying moiré patterns in bitmapped images.

Your favorite technical handbooks are now available in soft editions.

A new approach to math.

Introducing the Mathcad 3.1 Software System for Microsoft Windows or UNIX. It revolutionizes math by letting you zip through problems naturally and logically—

because it works the way you think. And now it's even more powerful, thanks to new Electronic Handbooks™.

More than a number-cruncher.

With Mathcad 3.1, you type your work anywhere into the live screen—just like you'd

write on a scratchpad—and Mathcad does the calculating. Updates answers when a variable changes. Even graphs in 2-D or 3-D.

Symbolic calculation capabilities let you do integrals, Taylor series, or infinite sum calculations with click-n-drag simplicity.

And when you're done, Mathcad prints out presentation-quality documents complete with equations in real math notation.

Fast electronic access to commonly used methods, formulas and diagrams.

Mathcad's new Electronic Handbooks give you instant access to the formulas, methods,

mulas for specific calculations. Change parameters, plots and variables, and let Mathcad automatically calculate your answers within the Handbook. Or double-click on a Handbook entry and paste it into your Mathcad document—with the correct units!

Three new optional Mathcad Electronic Handbooks* are now available, each created in conjunction with a leading publisher of technical reference handbooks:

- **Mathcad Treasury of Methods and Formulas** offers you a host of the methods, formulas and diagrams you use every day, along with interactive explanations of every feature and algorithm of Mathcad.
- **Machine Design and Analysis** from Hicks' *Standard Handbook of Engineering Calculations* from McGraw-Hill, contains more than 125 practical calculation procedures including shaft and gear mechanics, time and power to cut, drill, bore, countersink, and a lot more.

• The CRC

Materials Science and Engineering Handbook contains more than 140 tables of data, bit-mapped illustrations, and Mathcad plots. Includes densities, melting points and crystal structures of elements, properties of ceramics and superconducting materials, and much more.

Also Available:

- **Optional Applications Packs**—adaptable Mathcad templates for Electrical, Mechanical, Civil and Chemical Engineering, Statistics, Advanced Math, and Numerical Methods.
- PC DOS and Macintosh® versions also available.

Free demo disk.

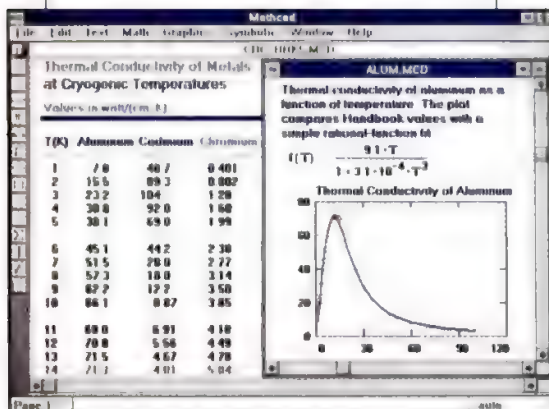
For a FREE Mathcad demo disk, or upgrade information, call 1-800-MATHCAD (or 617-577-1017, Fax 617-577-8829).

Or see your software dealer.

*Electronic Handbooks require Mathcad 3.1 and Microsoft Windows 3.0 (or higher) or UNIX.

© 1992 MathSoft, Inc. TM and ® signify manufacturer's trademark or registered trademark respectively.

UNIX
Version now available



diagrams and tables you rely on every day. Just open an Electronic Handbook and select your topic. They're interactive, so you can modify for-



1-800-MATHCAD

The answer is Mathcad®



Feels Good.

Lots of mice feel good, but not as good as MouseMan—the world's first left- and right-handed, and cordless radio mice. In a survey of 2,000 experienced mice users, 77% agree MouseMan feels better than anything they've ever tried. At computer dealers everywhere. 1-800-231-7717

Left and right-handed corded versions & right-handed cordless for IBM-type PCs, right-handed corded versions for MACs. ® /™ trademarks belong to registered owners. GSA approved



Feels Better.



CIRCLE 182 ON READER SERVICE CARD

RATING THE PRODUCTS: SUITABILITY TO TASK

Although *Microsoft Publisher* clearly surpasses the rest of the crowd, none of the packages performed poorly or proved unusable.

THE TASKS



Text handling evaluates the package's typographic controls and word processing functions. This includes supplying an adequate number of attractive scalable typefaces. Leading and intercharacter-spacing control are a must; tracking control makes life easier. You should be able to import an ASCII file and perform simple copyfitting (manual text editing) within the package, if necessary. A spell-checker and hyphenation dictionary are a big help, while automatic tables and bullet lists also enhance productivity.



The program's **Graphics handling** should at least have the ability to import simple gray-scale and monochrome bitmaps (TIFF or .PCX) and be able to crop and resize them while preserving the aspect ratio. The package should include at least a few usable vector clip-art pieces, and be able to import at least one form of vector clip art as well. If the package has some sort of small drawing utility in which you can edit the clip art, so much the better. WYSIWYG display is a big help, so long as it doesn't slow the program down to a crawl; you should have the option of turning off bitmap display when necessary. The ability to produce a desired gray tint is a plus.



Page layout assesses the product's facility at mixing multiple-column layouts on a page, the flexibility and breadth of rules, the ability to handle graphics within a header or footer, and the use of tables and lists as insets. The ability to see and work in a multiple-page view can speed formatting immensely.



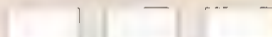
Printing evaluates how easily, quickly, and correctly the application can print a publication.

- 1—Poor
- 2—Satisfactory
- 3—Good
- 4—Excellent

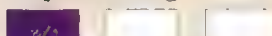
Suitability to Task

Product Name

Text handling



Graphics handling



Page layout



Printing



approach to desktop publishing and really deserves the title "personal publisher." Each is targeted, first and foremost, to individual designers who need to produce high-quality newsletters, brochures, and letters with a minimum of fuss and bother. As you read the reviews that follow, you will discover the distinctive character traits of each product as reflected in its tool sets. You'll see that one product can best double as a drawing program, while another concentrates on splashy text effects, and yet a third stresses automated design;

there's sure to be a perfect match for your personal publishing needs.

All reviews by James Karney

UNISON WORLD SOFTWARE

Avagio

Avagio is a study in contradictions. This \$149.95 DTP (desktop publishing) package from Unison World Software is packed with features, but will work well with a

Suitability to Task

Avagio

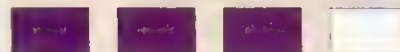
Text handling



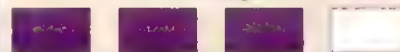
Graphics handling



Page layout



Printing



relatively modest computer setup. It's able to create sophisticated graphics, but unable to import most simple ones.

Users with limited hardware will appreciate this program; it will run on a 640K RAM system and give you WYSIWYG performance on a CGA monitor. In addition, *Avagio* can print a variety of scalable fonts on dot matrix and 300-dot-per-inch laser printers.

There are trade-offs, though, including a screen that looks like it displays CGA resolution even on a Super VGA monitor, and coarse WYSIWYG that makes it difficult to place elements precisely. What you gain in features you lose in speed: *Avagio* redraws screens as much as six times as slow as its competitors.

In addition, the quality of the user interface varies. Some dialog boxes are well designed, while many others will bewilder the newcomer. You can quickly and easily set up the basic page by specifying paper size, margins, and numbering methods via a dialog box; selecting fonts, including point size and styles, is also a snap. But deciphering *Avagio's* Font Effects controls is far more complicated; the dialog box for Character and Background Mingle includes arcane options such as Black is Set, White is Filter.

Despite its complexity, *Avagio's* Mingle tool can produce excellent graphics. This feature offers many effects normally found in high-end draw programs, such as the ability to redefine the black-and-white parts of overlapping elements. Unlike most of its competitors, *Avagio* treats all objects except imported bitmaps as outlines. Mingle gives you precise control over an object's fill, outline, and color. But plan to devote some time to learning how to use this feature; the manual leaves a lot to the imagination.



SUMMARY OF FEATURES

Products listed in alphabetical order

—Editors' Choice
☒ —Yes ☐ —No

	Avagio	Express Publisher	Microsoft Publisher	PagePlus	Publish-It!
List price	\$149.95	\$159.00	\$199.00	\$129.00	\$249.95
Operating environment	DOS	DOS	Windows	Windows	DOS
HARDWARE REQUIREMENTS					
Disk space required	4.2MB	3MB	6MB	2MB	3MB
Conventional RAM required	640K	640K	1MB	1MB	640K
Supports expanded/extended memory	☒	☒	☒	☒	☒
Maximum display resolution	640 x 480	640 x 480	Any Windows-compatible resolution	Any Windows-compatible resolution	640 x 480
Mouse supported	☒	☒	☒	☒	☒
INTERFACE					
Workspace metaphor	Pasteboard	Frame-based	Pasteboard	Pasteboard	Frame-based
Zoom:					
Fixed increments	☒	☒	☒	☒	☒
Continuously variable	☐	☐	☐	☒	☐
Marquee box	☐	☐	☐	☒	☐
View facing pages	☒	☒	☐	☒	☒
Pan	☒	☐	☒	☒	☒
Undo	☒	☒	☒	☒	☒
PAGE LAYOUT					
Master pages	☒	☐	☒	☐	☒
Templates	☐	☒	☒	☐	☒
Number of predefined templates	N/A	8	23	N/A	98
Types of publications	N/A	Bulletins, coupons, invitations, newsletters	Calendars, cards, newsletters	N/A	Invitations, newsletters, reports
Maximum pages per document	Memory-dependent	32	Object-dependent	100	999
Maximum page size (inches)	17 x 17	11 x 14	19.75 x 19.75	23 x 23	22.5 x 22.5
Custom page sizes	☒	☒	☒	☒	☒
Maximum number of columns	Unlimited	Unlimited	63	Unlimited	100
Creates new pages for auto text flow	☒	☐	☒	☐	☒
Inserts and removes pages	☒	☒	☒	☒	☒
Rearranges pages	☐	☐	☐	☒	☐
Links frames	☒	☒	☒	☐	☒
Allows frame locking and unlocking	☒	☒	☐	☐	☐
Automatic headers and footers	☒	☒	☐	☐	☒
Automatic page numbering	☒	☒	☒	☐	☒
Starts with new page number	☒	☒	☒	N/A	☒
Variable numbering styles	☒	☒	☐	N/A	☒
Consecutive numbering across entire document	☒	☒	☒	N/A	☒
Page numbering of sections	☐	☐	☐	N/A	☐
Automatic control of widows and orphans	☐	☐	☐	☐	☐
Rulers					
Units:					
Inches/centimeters	☒	☒	☒	☒	☒
Picas and points	☒	☒	☒	☒	☒
Fractional points	☐	☐	☐	☐	☐
Other	User-defined	None	None	Cerio, didot	None
Independent x and y rulers	☒	☒	☒	☒	☒
Shows cursor position on ruler	☒	☒	☒	☒	☒
Shows cursor coordinates	☒	☐	☐	☐	☐
User can set zero point	☐	☐	☒	☒	☐
Alignment options:					
Column guides	☒	☐	☒	☒	☒
Freeform guides	☒	☐	☐	☒	☒
Snap to grids	☒	☒	☒	☒	☒

N/A—Not applicable: The product does not have this feature.

CONTINUES

GRAPHICS LOW-COST DTP

SUMMARY OF FEATURES



	Avagio	Express Publisher	Microsoft Publisher	PagePlus	Publish-It!
FONTS AND TYPOGRAPHY					
Maximum typefaces per document	Unlimited	48	Unlimited	Unlimited	Unlimited
True quotation marks	■	■	■	■	■
True em and en dashes	□	■	■	■	□
Smart quotes and dashes	□	□	■	■	■
True typographical spacing (em, en, thin spaces)	■	■	■	■	■
Super- and subscripts	■	■	■	■	■
Full caps	■	■	■	■	□
Small caps	■	■	■	■	■
Double underline	□	■	■	■	■
Scalable fonts	Micrologic	Agfa	WordArt	URW	Typografica
Format provided	ATEK/Micrologic	Intellifont	Proprietary MLS	URW	Typografica
Other supported formats	None	None	All Windows fonts	All Windows fonts	Bitstream, PostScript Types 1 and 3
Printer fonts supported	None	None	All Windows-compatible fonts	All Windows-compatible fonts	PostScript
HP cartridge fonts supported	N/A	N/A	■	■	■
Downloadable bitmapped fonts supported	■	■	■	■	■
Displays matching screen fonts	■	■	■	■	■
Point-size range	5-500	6-144	4-500	4-250	3-250
Text rotation	■	■	■	■	■
90 degrees	■	■	■	■	N/A
Any angle	■	■	■	■	N/A
Combine horizontal and vertical text on one page	■	■	■	■	N/A
Reverse type	■	■	■	■	■
Colored or tinted type	■	■	■	■	■
Adjustable spacing:					
Letter	■	■	■	■	■
Word	□	■	■	■	■
Leading	Points	Points	Any measure	Percent of point size	Points
Kerning	■	■	■	■	■
Auto	■	■	■	■	■
Manual	■	■	■	■	■
TEXT FORMATTING					
Links layout to separate text files	□	□	■	□	■
Supports paste links (DDE)	□	□	■	□	■
Supports OLE	□	□	■	□	■
Merges text from several files	■	■	■	■	■
Allows embedded type codes	■	□	■	■	■
Uses stylesheets	■	■	■	■	■
Character styles	■	□	■	■	■
Paragraph styles	■	■	■	■	■
Section styles	□	□	■	■	■
Hyphenation:					
Automatic	■	■	■	■	■
Manual	■	■	■	■	■
Hyphenates foreign languages	□	□	■	■	■
Text alignment:					
Flush left or flush right	■	■	■	■	■
Center	■	■	■	■	■
Justify	■	■	■	■	■
Set via icons	■	■	■	■	■
Tabs:					
Maximum number definable	Unlimited	15	Unlimited	N/A	14
Leaders available	Unlimited	None	3	None	4

N/A—Not applicable: The product does not have this feature.

CONTINUES

If

I have
to listen to one more minute
of small talk I'm going to
spontaneously combust, Brad
thought to himself as he reached
for another canape. And then
he saw her.

It

was the
exotic brunette he'd seen at the
intersection. And he knew he
had to meet her.

His

heart was pounding as he worked his way across the crowded room. Their eyes met and she smiled in recognition. And then she said in a sultry voice,



Did

you ever call
CompuAdd Express?"

Before Brad could answer, a guy in a lime green leisure suit blurted out, "CompuAdd Express? That wild computer company in Texas? Boy, do they make great computers!"

Like the Express 325 NXL Notebook. **New!**

- 80386SX low power/25MHz
- 4MB RAM
- 9600 baud fax/2400 baud modem
- 60MB hard drive
- DR -DOS 6.0
- Manufactured in U.S.A.
- **Built-in Mouse trackball**

Big features, little box. That's the Express 325 NXL. With extra power on the road—and in the office, too—this 6-pound wonder comes with everything you want in a notebook. And more.

- 64 levels of grayscale video
- 9.4" diagonal display useable
- Super-twist backlit liquid crystal display
- Internal 3.5" 1.44MB high-density diskette drive
- 80387SX math coprocessor socket
- 101-key function keyboard implemented with 84-key layout
- External PS/2 keyboard connector
- External 800 × 600 VGA video connector
- External PS/2 mouse connector
- One serial port, one parallel port
- True notebook size (8.5" × 11")
- Less than 6 pounds
- Carrying case included
- Power management logic for battery life up to 4 hours
- Sleep button
- AC wall adapter
- \$2,095

Then that woman with big hair and enough blue eyeshadow to sink a battleship chimed in, "And if their prices were any lower, they'd be givin' 'em away!"

The Express 433 is such a deal!

Speed like you've never seen. Expandability that makes this desktop system almost as versatile as a tower. The new Express 433 has your name written all over it. Check out these exciting features:

FULL PROFILE • 486DX rated at 33MHz • 4MB DRAM expandable to 32MB • 64KB cache • 120MB hard drive • Dual floppy drive, containing 5.25" 1.2MB and 3.5" 1.44 MB high-density diskette drives • 5 half height 5.25" drive bays • 8 ISA slots • HRVGA monitor (1024 × 768) • Weitek 4167 coprocessor socket • 1 parallel port and 2 serial ports • DR DOS 6.0 • \$2,195



We accept MasterCard, VISA, money orders, certified checks (please allow ten days for processing), CODs, company and institutional purchase orders (minimum initial purchase \$250, thereafter \$50 with approved credit) and wire transfers. Shipping charges are calculated according to weight and distance. Texas residents, please add appropriate local sales tax. CompuAdd Express will replace or repair defective hardware, software and consumable items. A 15 percent restocking fee may be charged. All return items must be accompanied by a return merchandise authorization (RMA) number. Prices and product descriptions are subject to change without notice. CompuAdd Express is not liable for damage due to omissions or typographical errors.

Some guy in a turban with a jeweled cigarette holder added, "Talk about fast. They had my computer shipped out within two working days!"



Express 420s

FULL PROFILE • i486SX rated at 20MHz • 4MB DRAM expandable to 32MB • 64KB cache • 80MB hard drive • Dual floppy drive, containing 5.25" 1.2MB and 3.5" 1.44MB high-density diskette drives • 5 half height 5.25" drive bays • 8 ISA slots • HRVGA monitor (1024 × 768) • Intel upgrade processor socket • Weitek 4167 coprocessor socket • 1 parallel port and 2 serial ports • DR DOS 6.0 • \$1,895

The Rastafarian in brightly colored bermuda shorts laughed and said, "Ya, mon. And they test every system before it's shipped, so you know you'll get a smooth running system."

Express 333

LOW PROFILE • 80386 rated at 33MHz • 4MB DRAM expandable to 32MB • 32KB cache • 80MB hard drive • Dual floppy drive, containing 5.25" 1.2MB and 3.5" 1.44 MB high-density diskette drives • 3 full-size 16-bit and 2 half-size 8-bit slots • HRVGA monitor (1024 × 768) • 80387 math coprocessor socket • 1 parallel port and 2 serial ports • DR DOS 6.0 • \$1,795



"You know they used to be part of CompuAdd. But they wanted to put more in a computer and sell it for less. So they started their own company," the gentleman with the bad toupee stated emphatically.

It's easy to understand why CompuAdd Express has become an instant success. Ever since we spun off from CompuAdd, we've dedicated ourselves to streamlining our operation. We've gotten rid of all the unnecessary corporate frills our competitors seem to like so much. Because we know our buyers are more sophisticated. You know what you want. (A great computer for a fair price and with quick delivery.) And we don't think you should pay the same as folks who like fancy showrooms and pesky salespeople. (We do believe in friendly, knowledgeable salespeople, though.)

800-925-9119 CompuAdd
Express

The strolling violinist finished his final note with a flourish and said, "Saviez-vous que leurs 325s sont plus rapides et meilleurs qu'un 320s et coûtent le même prix?" (translation: "Did you hear their 325s are faster and better than a 320s at the same price?")



Express 325s

LOW PROFILE • 80386SX rated at 25MHz • 4MB DRAM expandable to 16MB • 40MB hard drive • Dual floppy drive, containing 5.25" 1.2MB and 3.5" 1.44MB high-density diskette drives • HRVGA monitor (1024 × 768) • 3 full-size 16-bit and 2 half-size 8-bit slots • 80387SX math coprocessor socket • 1 parallel port and 2 serial ports • DR DOS 6.0 • \$1,395

They were joined by a woman with a tattoo who was wearing a taffeta gown. "But did you know CompuAdd Express guarantees all their products and backs them with toll-free technical support?" she asked.

Express 216

LOW PROFILE • 80286 rated at 16MHz • 2 MB DRAM expandable to 4MB • 40MB hard drive • Dual floppy drive, containing 5.25" 1.2MB and 3.5" 1.44MB high-density diskette drives • HRVGA monitor (1024 × 768) • 3 full-size and 2 half-size expansion slots • 80287 math coprocessor socket • 1 parallel port and 2 serial ports • DR DOS 6.0 • \$1,095



Brad knew he had to regain control of the situation if he ever hoped to talk to the exotic brunette again. But before he could speak, she smiled at him and said, "I love a system that comes with all the extras, don't you?"

If you do have a problem with your CompuAdd Express system, our technical support staff can solve 90 percent of computer problems over the telephone, usually in less than 5 minutes. They can solve your problems so easily because they work closely with the engineers who designed your system and with the technicians who built it.

If we cannot troubleshoot the problem over the telephone, we will replace (via Federal Express delivery) faulty major components or systems for the first 30 days after purchase. This "Express Exchange" policy covers the period in which most system failures occur.

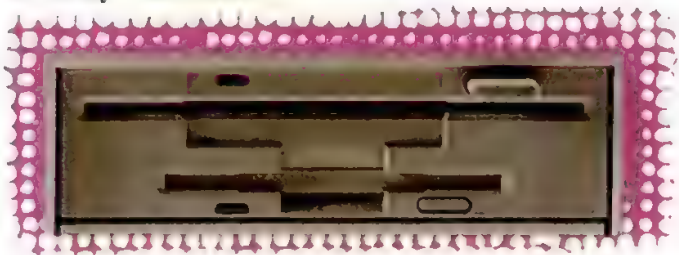
For the first year, we provide free parts and labor for a year on systems shipped back to us for repairs. A three-day in-house turn time is guaranteed. If we miss this turn around time due to parts availability, we will ship via Federal Express A.M. to you at no cost.

This was his chance! He seized the moment, took one step closer to her and whispered, "Especially a dual floppy disk drive and **FREE DR DOS.**"

Get a Free Dual Floppy Disk Drive On Every CompuAdd Express System.

You get the drive bay expandability you want in any size box with our new dual floppy disk drive. It fits both a 5.25" and a 3.25" drive into one half height 5.25" drive bay. That means:

- it's better than the two floppies other manufacturers offer.
- because there's room for another hard drive, a tape backup or (on full profile systems) a CD ROM drive.
- trading diskettes with co-workers is easier.
- copying from one diskette to another is easier.



DR DOS 6.0: Standard Equipment on Every CompuAdd Express Computer.

DR DOS is more than an operating system. It's a set of sophisticated utilities for controlling the storage space on your hard drive and the speed with which you access data.

- DR DOS 6.0 data compression can give your hard drive up to double its normal capacity.
- Disk caching lets you access your data faster.
- DR DOS 6.0 can load itself into upper memory, leaving more room in conventional memory for programs and data.
- Disk optimizer can reorganize your hard drive to reduce access time.

Plus, you get dozens of utilities including undeleter, quick format/unformat, password security and an online manual.

Choose one of these systems or ask us about other available configurations. And remember, with CompuAdd Express you get: Toll free technical support • One year limited warranty covering replacement or repair of defective hardware • Express 30-day exchange • Rapid repairs • Technical bulletin board service. Call to order or to request a free catalog.

Does Brad finally get to have a moment alone with the exotic brunette? Will he ever find out what her name is? Will he just give up? Or will he go home and call CompuAdd Express?

800-925-9119 CompuAdd

12306 Technology Boulevard, Austin, Texas 78727
Hours: 8am-6pm (CST) M-F • 512-219-1800 • Fax 512-219-2890

Express

SUMMARY OF FEATURES

PC

	Avagio	Express Publisher	Microsoft Publisher	PagePlus	Publish-It!
TEXT FORMATTING (continued)					
Automatic table generation	■	■	■	■	■
Automatic bulleted lists	■	■	■	■	■
Automatic numbered lists	■	■	■	■	■
Automatic pull quotes	■	■	■	■	■
Vertical justification and alignment	■	■	■	■	■
Greeks text	■	■	■	■	■
User-adjustable threshold	■	■	■	■	■
TEXT HANDLING					
Cut, paste, copy	■	■	■	■	■
Drag-and-drop	■	■	■	■	■
Global search-and-replace	■	■	■	■	■
Spell-checker	■	■	■	■	■
Thesaurus	■	■	■	■	■
Text import formats:					
ASCII	■	■	■	■	■
Ami Pro	■	■	■	■	■
Microsoft Word (DOS)	■	■	■	■	■
Versions	5.0	3.0, 5.0	All	■	4.0, 5.0, 5.5
Word for Windows	■	■	■	■	■
Version 1.1	■	■	■	■	■
Version 2.0	■	■	■	■	■
WordPerfect	■	■	■	■	■
Version 4.2	■	■	■	■	■
Version 5.x	■	■	■	■	■
WordPerfect for Windows	■	■	■	■	■
WordStar	■	■	■	■	■
XyWrite	■	■	■	■	■
DCA	■	■	■	■	■
RTF	■	■	■	■	■
Data import:					
.WKx	■	■	■	■	■
.XLS	■	■	■	■	■
.DBF	■	■	■	■	■
GRAPHICS HANDLING					
Supports paste links	■	■	■	■	■
Supports OLE	■	■	■	■	■
Support for 24-bit color	■	■	■	■	■
Vector graphics import/export:					
.CDR (CorelDRAW)	■/■	■/■	■/■	■/■	■/■
CGM	■/■	■/■	■/■	■/■	■/■
.DRW (Lotus 1-2-3)	■/■	■/■	■/■	■/■	■/■
.DRW (Micrografx Designer)	■/■	■/■	■/■	■/■	■/■
EPS (noneditable)	■/■	■/■	■/■	■/■	■/■
EPS (editable)	■/■	■/■	■/■	■/■	■/■
.GEM (GEM vector)	■/■	■/■	■/■	■/■	■/■
HPGL	■/■	■/■	■/■	■/■	■/■
.PIC (Lotus)	■/■	■/■	■/■	■/■	■/■
.WMF (Windows Metafile)	■/■	■/■	■/■	■/■	■/■
.WPG (WordPerfect graphic)	■/■	■/■	■/■	■/■	■/■
Bitmap graphics file import/export:					
.BMP (Windows bitmap)	■/■	■/■	■/■	■/■	■/■
.JPG (GEM)	■/■	■/■	■/■	■/■	■/■
.PCX	■/■	■/■	■/■	■/■	■/■
.TIFF	■/■	■/■	■/■	■/■	■/■

* Via a vector-to-bitmap conversion utility.

CONTINUES

SUMMARY OF FEATURES

	Avagio	Express Publisher	Microsoft Publisher	PagePlus	Publish-It!
GRAPHICS HANDLING (continued)					
Graphics manipulation:					
Fixed scaling	■	■	■	□	■
Continuous scaling	■	■	■	■	■
Cropping	■	■	■	■	■
Padding	■	■	■	■	■
Flipping	■	■	■	■	■
Rotation	■	■	■	■	■
Wraps around graphics:					
Irregular	□	■	□	■	□
User-defined polygon	□	□	□	■	■
Square	■	■	■	■	■
Define wrap as attribute of graphic	□	■	□	■	■
Force wrap via menu	□	■	□	■	■
Clip art	Various vendors	FCW Series	Corel	Electronic Pen	Various vendors
Number of images	110	100	100	110	131
Format	.PCX, TIFF, .UWI	TIFF	CGM	.PCX, .WMF	.GEM, .IMG, .PCX
Drawing tools:					
Line	■	■	■	■	■
Number of styles	25	4	1	12	8
Number of end styles	None	None	1	None	1
Rectangle	■	■	■	■	■
Circle and ellipse	■	■	■	■	■
Arc	■	□	□	□	■
Spline curve	□	■	□	□	□
Bezier curve	■	□	□	□	□
Freehand curve	■	□	□	□	■
Polygon	■	■	□	□	■
Polyline	■	□	□	□	■
Other	Arrow, star	Rounded rectangle	Rounded rectangle, borders	None	None
Number of fill patterns	25	160	15	7	36
Number of gray shades	100	32	8	100	9
Number of colors	256,000	1	8	16.8 million	2
OUTPUT SUPPORT					
Monochrome printers:					
Epson 24-pin dot matrix printer	■	■	■	■	■
IBM Proprinter	■	■	■	■	■
HP DeskJet	■	■	■	■	■
Canon BubbleJet	■	□	■	■	■
HP LaserJet II (PCL 4)	■	■	■	■	■
HP LaserJet III (PCL 5)	■	■	■	■	■
PostScript printer	□	■	■	■	■
Color devices:					
HP PaintJet	■	■	■	■	□
HP DeskJet C	■	■	■	■	□
Color PostScript printers	□	□	■ (with Windows driver)	■ (with Windows driver)	□
HP plotters	□	□	■	□	□
DOCUMENTATION					
User and reference manuals	■	■	■	■	■
Printed tutorial	■	■	■	■	■
On-screen tutorial	■	■	■	■	■
Sample files	■	■	■	■	■

ENDS

You want a high quality file server with outstanding performance, compatibility and expandability. So...

Make Northgate Elegance™ 486/33 EISA The Heart Of Your LAN!

How good is Northgate Elegance 486/33e?

Here's how *PC Magazine** summed it up:

"The Northgate Elegance 433e is a turnkey NetWare® computer with a laudable price..."

"It's not just the eight bays that make this machine special. A hard disk controller designed specifically to work with NetWare®, plenty of memory- and board-expansions capacity; a hefty, cool and quiet power supply; and Northgate's focus on network-specific support all make the Elegance an excellent choice as a Novell® file server."

"...Northgate gives network administrators everything they need - a turnkey system with hard disks optimized for NetWare, excellent expansion capability and good performance..."

"...Northgate preconfigures every Elegance 433e to each network administrator's needs. Plug it in and it works."

"The Northgate Elegance 433e, with its well-rounded and sensible configuration, has it all; a performance/features score that's better than average and a dynamite price which together create a higher-than-average Bang for the Buck score. The server is even Novell certified."



Turn the page for all the benefits of owning a Northgate LAN solution...

At Last! Hassle-free Turn-Key LAN Solutions

Northgate® recognized your need for LAN systems that save you time, money and aggravation. That's why we pioneered the direct sales of full-service LAN solutions. Now, it's incredibly easy to give your business networking efficiencies, because we do it all from the installation of networking hardware and software to service and support.

The foundation of a Northgate LAN is award-winning hardware—including the incredible Elegance™ 486/33 EISA file server, recently selected as *PC Magazine's* "Editors' Choice." Northgate's full range of performance-engineered products allows our LAN experts to custom design your LAN complete with installed networking cards and software, to meet your broadest business applications.

High Performance Networks For Up To Hundreds Of Users.

Whether you need an entry level network for as few as four users or a complex LAN with hundreds of workstations, Northgate has an industry-standard solution that's second to none. Take a look at everything Northgate offers:

Powerful File Servers and Workstations. Northgate offers file servers ranging from our 386/33 to our 486/33 EISA systems. And, all are FCC Class B certified. Northgate also offers you a complete range of workstations, featuring our popular 386SX™/20 systems.

Choice of Topologies. Northgate offers a variety of topologies to meet your applications. Select from ARCNET, ETHERNET Thin Net, or ETHERNET 10BASE-T. Token Ring products also available.



Looking for a LAN that can be moved without the expense and hassle of rewiring? Northgate's wireless technology is the answer!

Four Network System Environments. Northgate's strategic partnership with Novell allows us to offer you NetWare® 386 3.11, 286 2.2, NetWare Lite and Lantastic®.

Full Service Featuring Support From Certified NetWare Engineers. If you're a LAN administrator, imagine the convenience of being able to pick up the phone 24 hours a day, seven days a week and speak with someone who's on your level. That's exactly what you get when you own a Northgate LAN. Our skilled technicians are backed by Certified NetWare Engineers and the call is free when you purchase NetWare and LAN support package through us.

Backed By Certified NetWare® Engineers.



"Editors' Choice" Elegance 486 EISA Configuration:

- Intel® 80486/33MHz processor
- 32MB of 80ns RAM
- 128K SRAM memory cache; read/write-back caching
- 676MB SCSI 16ms hard drive
- Ciprico Rimfire 5600 SCSI controller
- EISA bus with eight 32-bit expansion slots: six bus master; two slave
- 1.2MB 5.25" and 1.44MB 3.5" floppy drives
- Weitek® 4167 math coprocessor support
- One serial, one parallel and one PS/2® style mouse port
- 300 watt power supply with dual recirculation fans
- Eight bay upright Tower case; room for eight external half-height devices
- OmniKey® keyboard
- 14" monochrome monitor with 720 x 348 video card
- MS-DOS 5.0
- Microsoft® Windows™ and mouse
- DiagSoft™ QA Plus™ diagnostic/performance software
- One year limited warranty on system parts and labor; five years on keyboard
- On-site hardware service provided by NCR®
- FCC Class B Certified
- Novell Certified

"Editors' Choice" Elegance 486/33 EISA Configuration \$7399

Lease as low as \$248.05 per month**

Other Configurations Starting At: \$3649

Call For LAN Pricing And Custom
Configuration Information
800-828-6125

Major corporations, volume purchasers and government agencies call National Business Accounts: 800-545-6065
Charge it to your VISA, MasterCard, Discover, American Express or Northgate Big 'N' card.

Look at all the other Northgate extras. You also receive free non-diagnostic on-site hardware service from NCR® for one year. As well as a limited one year parts and labor warranty and overnight shipment of replacement parts at our expense. Customized service and support packages – including extended warranty coverage – are also available.

To discover all the advantages of a networking solution from Northgate, call us toll free, today.



7075 Flying Cloud Drive, Eden Prairie, MN 55344

CODE A3909

shipping/handling charges and appropriate sales taxes. Northgate reserves the right to substitute components of equal or greater quality or performance. All items subject to availability. We support the ethical use of software. To report software copyright violations, call the Software Publishers Association's Anti-Piracy Hotline at 1-800-388-PIRS. *PC Magazine, March 17, 1992. **Monthly lease payments are based on a 36-month standard, fair market value open-ended lease. 12-60 month leasing options to qualified businesses.

GRAPHICS LOW-COST DTP

Avagio's drawing tools are equally adept. Polygon shapes are actually Bezier curves that can be edited with the pointer tool. You can produce complex gradient fills that resemble those done with *CorelDRAW* or *Micrografx Designer*, and *Avagio* even supports layers, which let you overlay objects on top of each other for special effects. In addition, the program lets you create spot colors using cyan, magenta, and yellow primaries, then save them for future use.

In spite of *Avagio's* strong graphics creation ability, importing vector graphics is a challenge. You must use a separate program to convert EPS files before they can be imported—the program has a prob-

lem with *CorelDRAW* EPS files—and *Avagio* does not support CGM at all. Fortunately the program's gray-scale TIFF handling is very good; both pictures we loaded were easy to place and crop and printed well.

GOOD WITH WORDS

Avagio isn't lacking in its text control. You can set named styles for paragraphs and apply them throughout a document. Imported files automatically adopt the current font and style settings. The text tool allows you to modify individual characters and type directly into a blank frame,

while the auto-sizing feature lets you build blocks the same size as the text. The program has auto-hyphenation, which you can tweak by either setting a tighter hyphenation zone or with manual insertions.

Importing files and linking frames for the jump story in our test newsletter was simple, and the menu options were easy to understand. As with most entry-level programs, though, getting adjacent frames to line up required some work.

Unfortunately, *Avagio* is slow to load and print files; we found that this program took at least 30 percent longer than the other products in this review to produce our test newsletter. In addition, there is no PostScript driver. On the plus side, the

WHEN A WORD PROCESSOR WILL DO

by James Karney

If we judged software by the features listed on the box, entry-level desktop publishing programs would fall far short of the latest high-powered word crunchers. Both *Microsoft Word for Windows* and *Lotus's Ami Pro*, for instance, offer the Swiss Army knife approach to document creation, combining extensive text handling, graphics integration, table charting, and stylesheets with excellent WYSIWYG interfaces.

Although you've gained all these features, you've lost some ease of use. Today's word processors offer some layout features, but their primary job is still text editing; they treat a document as a flow of words that may be broken in places by an occasional frame with a graphic in it. *Ami Pro*, which allows frame-based page layout and most closely resembles these entry-level packages, handles DTP-type tasks so idiosyncratically that creating a typical newsletter can be more of an exercise in frustration than an exercise in creativity. *Ami Pro's* layout tools are not designed for quick-and-dirty publication creation. In contrast, the best of the entry-level publishers will let a novice get out a newsletter or flier on the first day.

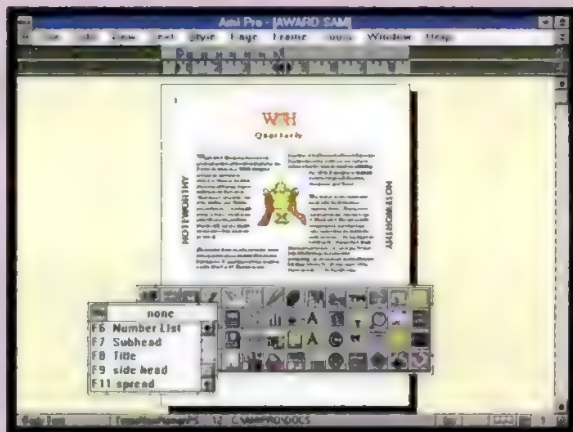
Entry-level DTP packages also win by a slim margin when competing on price: You can find *Microsoft Publisher* for around \$139 on the street and *Ami Pro* for about \$100 more.

But entry-level packages aren't always the best option. For instance, high-end word processors have table design modules that generally outperform the entry-level DTP crowd; *Word for Windows* has an especially nice implementation of this feature. But getting the table exactly where you want it may take a little more work than you'd like.

And the picture changes dramatically with longer publications. If you are faced with producing a project like a dissertation or technical documentation, a word processor wins hands down. Tools for handling complex auto-numbering schemes, footnotes, annotations, and a table of contents are built into programs like *Word* and *WordPerfect*, as are macro languages that help speed repetitive tasks. Their section division and file management capabilities help to organize your work. You won't find this kind of word-crafting power in an inexpensive publishing package.

Most users are comfortable

creating text in their favorite word processor and importing it into a DTP program later. Simple documents without multiple columns or a complicated design don't require publishing skills; but if you want to knock out a calendar, newsletter, or brochure, entry-level DTP programs offer you a faster way to get the job done with style.



Lotus's Ami Pro offers a broad range of DTP-like features, but its page-layout learning curve is considerably steeper than that of any of the packages we tested here. And while it has most of the capabilities necessary to re-create our test newsletter, it lacks the text-effect capabilities and some of the finer interface controls for dealing with frames that give the entry-level DTP packages their edge.



This is what you get
out of a \$4999,
plain paper, 300 dpi,
PostScript language
compatible printer.

PostScript is a registered trademark of Adobe Systems, Inc. Macintosh is a registered trademark of Apple Computer, Inc. LPR is a registered trademark of LPR.



Then again, so's this.

The choice is yours. You can stick with plain old black and white laser printing. Or you can pick the new Seiko Instruments Personal ColorPoint printer, and get rich laser-quality color documents.

You'll get sharp 300 dpi images on laser plain paper and transparencies. Speedy RISC processing. 100% PostScript language compatibility. And the ability to connect to Macintosh, PCs, and UNIX workstations simultaneously.

All for a monochrome price.

Which means switching to color is a black and white choice. To find out more call 1-800-873-4561 or 1-408-922-5900, department SI-99.



Introducing the Personal ColorPoint printer.

SI
Seiko Instruments



Avagio, Version 2.0

Unison World Software, 1321 Harbor Bay Pkwy., Alameda, CA 94501; 800-444-7553 (sales only), 510-748-6670.

List Price: \$149.95.

Requires: 286-based PC or better, 640K RAM, CGA display or better, DOS 3.0 or later, mouse.

In Short: *Avagio* offers a complete set of features and advanced graphics tools, but is limited by a very slow and complicated interface. Users who have limited funds and printer capability may find *Avagio* worthwhile for cost-effective desktop publishing, but those with less patience and more hardware should probably look elsewhere.

CIRCLE 456 ON READER SERVICE CARD

final printed copy looked quite clean—tints were even and the program passed almost all the design traps in our test newsletter.

Users who are willing to take the time to learn *Avagio* will find a host of excellent features at an affordable price. And for those without a laser printer, this program provides one of the few ways to get scalable fonts and fancy graphics. Those



Avagio offers a wealth of features packed within an occasionally awkward interface. Some dialog boxes, like this options box, are well designed, but others are hard to decipher.

GRAPHICS LOW-COST DTP

who have better hardware and less patience may want to shop around.

POWER UP SOFTWARE CORP.

Express Publisher

Like an old gas guzzler, *Express Publisher* is easy to operate, has lots of power under the hood, and needs lots of room: Running fully loaded, this \$159.95 package from Power Up Software Corp. will eat up at least 560K RAM. For all this overhead, *Express Publisher* gives you quite a bit, including excellent text editing and printer support, a clip-art library, plus a built-in program (called TextEffects) that turns text elements into graphics. Unfortunately, its graphics handling and user interface could stand some improvement.

The first things you notice when loading *Express Publisher* are a coarse-looking screen that seems designed for a CGA display and a slow-moving mouse. As with *Avagio*, the result is rather imprecise WYSIWYG.

Express Publisher is easy to learn, but slow to use. Based on the frame model, in which you place each object on the page in its own frame, it's easy to size or move elements, but it's not quite as nimble during the initial layout design. You can link several frames to contain a story that won't fit in one. When you edit, the text will automatically flow between the frames. You can format paragraphs by applying

styles. There are no movable positioning guides, and the rulers have fixed zero points.

Creating tables (like the one on page 3 of our test newsletter) is easy, thanks to *Express Publisher*'s simple method for placing tabs. All you do is select the frame, open the tab option from the text menu, and position the tabs on a sliding ruler. You are limited to only left and decimal tabs, without leaders. It's also easy to create attractive columns, since the

program automatically kerns and hyphenates all text.

For more sophisticated typographic effects, the program includes TextEffects, a typesetting module with a DDE (dynamic data exchange)-like link to *Express*

Publisher. You access TextEffects from within the main program, where you create a headline or logo. When you exit, text is saved to a file directly linked to *Express Publisher* and you are returned to that program. You can create text-filled polygons, fit text to a curve, shadow text, or distort its proportions with TextEffects.

GETTING THE PICTURE—SORT OF

There is both good news and bad news when it comes to *Express Publisher*'s graphics capabilities. The good news is

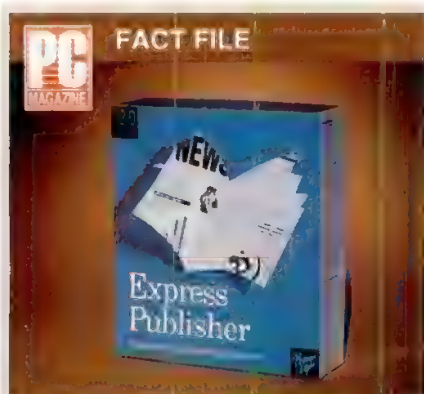


that it's easy to position and size graphics: You just point and click. The same technique wraps text around a graphic.

The bad news comes when you try to import anything but line art. *Express Publisher* does not support either gray-scale or color TIFF files, and converts color .PCX files to black and white. You can output EPS images to a PostScript printer, but you can't edit or view them on-screen. Your other vector option is to convert *Harvard Graphics*-flavor CGM files to TIFF and lose all the benefits of working in a vector format.

The sample images we tried to import fared poorly. The gray scales had to be loaded in CompuServe's Graphic Information File (.GIF) format. The problems with gray-scale images extended to the printouts as well. Both TIFF images in our test newsletter looked coarse. The tints and fills showed visible dots and patterns rather than a smooth tone when created within the layout module of the program. When created within the TextEffects module, the tints come out smooth; if the object is resized, however, you end up with banding. On the plus side, *Express Publisher* has reasonable print times.

At press time, a Microsoft Windows-based version of *Express Publisher* was in



Express Publisher, Version 2.0

Power Up Software Corp., 2929 Campus Dr., San Mateo, CA 94404; 415-345-5900.
List Price: \$159.95.

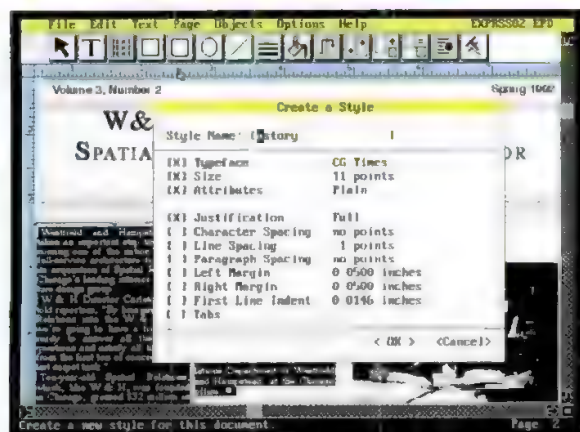
Requires: 640K RAM, CGA display or better, DOS 3.0 or later, mouse.

In Short: *Express Publisher* packs a lot of features into an easy-to-learn but awkward-to-use interface. Its good text handling and typographical effects are undermined by extremely limited graphics imports and below-par print quality.

CIRCLE 457 ON READER SERVICE CARD

its beta-testing cycle. This version adds a polygon tool and greatly increases graphics imports, including color and gray-scale files. Unfortunately, under Windows, TextEffects will be a separate, unlinked program called TextAppeal.

Express Publisher for DOS is full featured and very easy to learn. The text handling and special typographical effects are commendable, but the import abilities are just plain bad. Power Up needs to improve the program's graphics support and update the user interface to make *Express Publisher* competitive.



With *Express Publisher*, the easiest way to format text is by creating and applying paragraph styles. Styles can include font, size, attributes, spacing, justification, and more.

GRAPHICS

LOW-COST DTP

MICROSOFT CORP.

Microsoft Publisher

If you ever wished for a desktop publishing package with an autopilot, your wish has come true: *Microsoft Publisher* (\$199) goes a long way toward making document creation a painless, automated process.

This easy-to-use Windows program, which is aimed at entry-level users producing short documents, takes an intuitive approach to DTP. Every element on the page, text or graphic, is placed in a frame. Resizing is handled by clicking and dragging; the same actions will help you position objects within a frame. If you need to place objects within a column, *Publisher* can display custom nonprinting layout guides to help you along. You can also move the rulers located at the top and left side of the work area to any position on the page, so it's like having a T square inside the screen.

To automate the design process, *Publisher* offers both templates and PageWizards. PageWizards are essentially macros that work like very smart templates to build generic publications automatically. To create a basic document, you simply select a Wizard, answer the questions it asks, specifying design and layout options, then watch your publication take shape.

For inexperienced DTP users, Wizards represent a quick way to create a polished design. For more experienced users, they are a shortcut for adding complex elements like calendars or advertising to a document. Of course, you can ignore the Wizards and build your own templates or even build a document from scratch. *Publisher* includes clip art and an excellent collection of borders to dress up your design.

GETTING THE WORD

Publisher's text handling is almost as impressive as its Wizards. Like *Aldus Page-*

Maker, if you flow text too long to fit in a single frame or column you'll see an icon at the end of the frame to indicate that the rest of the story is being held in an overflow buffer. You can easily link text frames

together and move or delete them as a whole. Unfortunately, *Publisher* does not support styles, so there's no way to change a class of element throughout the entire document automatically. If you want to reduce all major headlines, you have to locate and change each one individually.

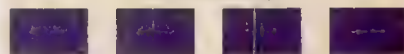
Publisher offers left-, center-, right-, and decimal-aligned tabs that you set from a dialog box. You can choose from dot-, dash-, and line-style leaders and even mix them on the same line.

Our sample text files imported perfectly, with the frame formatted to set the

Suitability to Task

Microsoft Publisher

Text handling



Graphics handling



Page layout



Printing



font, spacing, and indentation. The items we had to type in simply required drawing a new text frame and entering the letters. The 120,000-word spell-checker made short work of the two typos we planted. *Publisher* doesn't automatically hyphenate as a file is imported, though, so we had to select the text for hyphenation after it was placed on the page.

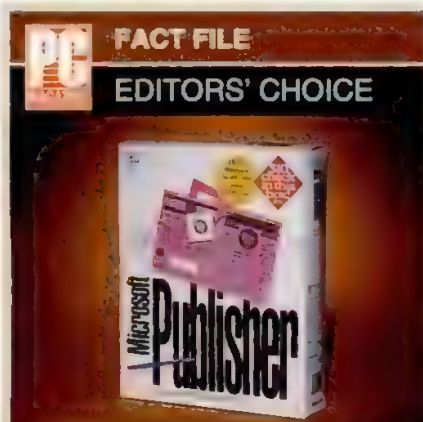
A GRAPHICS EXPERT

Publisher offers the most stable and extensive range of graphics imports of the programs we tested. EPS and CGM files loaded without any problems. You can preview images in the import dialog before loading them and easily crop them. To wrap text around an image, you must draw a rectangular frame for the text to flow around, so there is no way to wrap text around irregularly shaped images.

You can, however, perform some fancy text effects with the WordArt module, which uses OLE to link with *Publisher*. The options are somewhat limited, but you can stretch, shadow, fill, and rotate with ease, as well as wrap a text object into several shapes and crop and edit the resulting objects inside *Publisher*. What

GRAPHICS

LOW-COST DTP



Microsoft Publisher, Version 1.0

Microsoft Corp., One Microsoft Way, Redmond, WA 98052; 800-426-9400, 206-882-8080.

List Price: \$199.

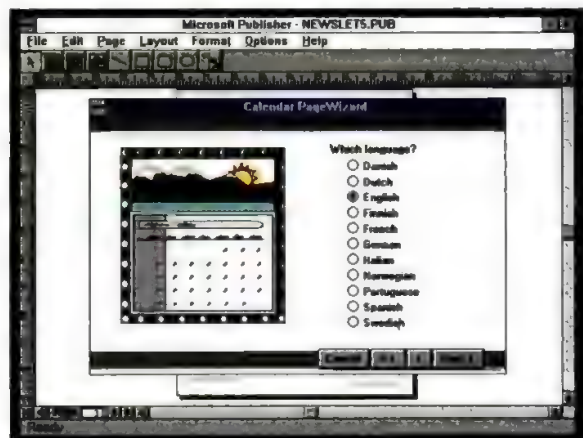
Requires: 286-based PC or better, 1MB RAM, EGA display or better, DOS 3.1 or later, Windows 3.x, mouse.

In Short: An easy-to-learn entry-level program with some slick features for novice users. A first-class performer when it comes to printing and text and graphics handling; its only flaw is a lack of paragraph styles.

CIRCLE 468 ON READER SERVICE CARD

you can't do with WordArt is access your normal fonts: You're forced to use proprietary fonts with obscure names. If you want an exact match with the type in your document, you may be disappointed.

When it comes to printing, *Publisher* is a first-class performer. Not only did it handle every task we set (with an occasional nudge), but it turned in the best printing times and the highest-quality output of all the packages included in this re-



Microsoft Publisher's PageWizards go a long way toward automating page design. You simply pick the Wizard that suits your needs, answer a few questions, and let the program do the rest.

view. And almost everything on paper looked as it did on-screen.

There is a lot to like in *Publisher*. It may not be the best choice for long or frequently produced documents, but it stands out from the rest as a well-designed and easy-to-use entry-level publishing program.

SERIF INC.

PagePlus

With its pasteboard-type interface and floating icon toolbox, Serif's easy-to-use Windows program bears a striking resemblance to *Aldus PageMaker*. But, unfortunately, the \$129 *PagePlus* lacks some fundamental features, making this program unsuited for anything more than basic page layout.

Page layout is easy and straightforward. You place objects directly on the page, just as you would on a traditional pasteboard, then move or resize them to try different designs. If you create or import an object, *PagePlus* uses the existing settings for that particular type. You can set a wide range of defaults by choosing a program option without an active object so that any new or imported item will use these defaults.

When it's time to manipulate text, you'll realize how easy it really is to use *PagePlus*. You can type directly on the page, import an existing file, or use the edit window. To flow imported text, you select the filename from a menu. The mouse cursor changes to cross-hairs; when you click the cursor, the text flows into the column. If there is more text than will fit the available space, you just go to the next location and click again. You set the spacing and alignment for paragraphs in one convenient menu, but units are all in percents. So, for instance, you can specify 80 percent leading, but not

11 points.

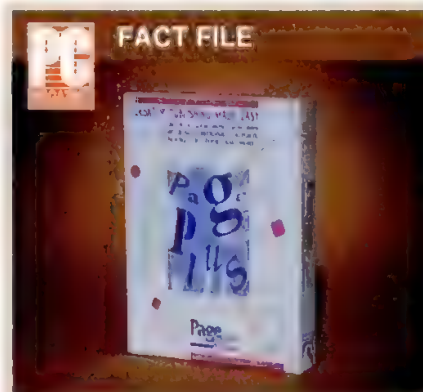
Once on the page, the text becomes an object in a block. You can resize the block with handles, or select portions of the text and modify individual letters. To change these attributes you call on the Property

Panel, a floating icon bar you can use to change the attributes of text, letter spacing, lines, or graphics. Setting up headlines like the "... Doing Good" on page 2 of our test newsletter was a breeze, thanks to the Property Panel. All we had to do was type in the text, select it, and use the Panel to fine-tune the spacing.

Graphics importing and scaling is also very straightforward. *PagePlus* can handle an extensive array of imports, including 24-bit color images. Wrapping text around a graphic is another of the program's strengths. To wrap text around a straight-sided object, you just click on the object with the Wrap Tool; the program takes care of the rest. Wrapping around irregular art is almost as simple. The Wrap cursor picks points on the box surrounding a graphic and pulls them into a custom shape, so text can flow around the new boundaries.

NO CONTROL

For all its elegance, however, *PagePlus* lacks templates, master pages, and style-sheets, though Serif plans to add them in the next version. *PagePlus* also has a few problems with text handling. When importing a file, for instance, the program will start a new text block if it encounters two hard returns in a row. To rejoin the text, you must either cut and paste or mod-



PagePlus, Version 1.2

Serif Inc., P.O. Box 803, Nashua, NH 03061; 603-889-8650.

List Price: \$129.

Requires: 286-based PC or better, 1MB RAM, 1.5MB hard disk space, Windows 3.x, mouse.

In Short: *PagePlus* is easy to learn and use, with an excellent interface and good layout tools, but it lacks templates, stylesheets, master pages, and tab controls. It is adequate for the beginner or occasional desktop publisher, but a poor choice for creating documents with frequently used layouts or for long publications.

CIRCLE 469 ON READER SERVICE CARD

Are You Ready for Windows 3.1?



Millions of copies later, Windows has changed the face of computing. Today, ATI welcomes Windows 3.1, a more reliable, usable, and robust graphical user interface.

ATI has affordable, high quality graphics boards with Windows 3.1 drivers available NOW! You can easily obtain these new drivers directly from ATI, or download them from ATI's bulletin board service (416) 756-4591, CompuServe's Windows Forums, or other popular BBSs. And they're faster than ever.

To truly maximize the performance of Windows 3.1 you need graphics acceleration. ATI graphics boards increase the

speed of Windows and all its applications beyond your expectations.

Industry experts state that ATI graphics boards are the best. Year after year ATI graphics products are awarded for their combination of superior features and performance. *PC Magazine's* Editors' Choice, *PC Computing's* Most Valuable Product award, and more.

Think you're ready for Windows 3.1? Ask yourself this. Do you need to increase the speed of Windows applications? View more information on-screen with resolutions up to 1280x1024? Increase colors up to 256? Eliminate annoying screen flicker with refresh rates

up to 76 Hz? Or, enhance TrueType to laser quality text using ATI's CRYSTAL Fonts rasterizer? Yes? Then you are ready for ATI Graphics Accelerators.

ATI Graphics Boards— Making Windows Work Better

GRAPHICS ULTRA™

8514•ULTRA™

GRAPHICS VANTAGE™

VGAWONDER XL™

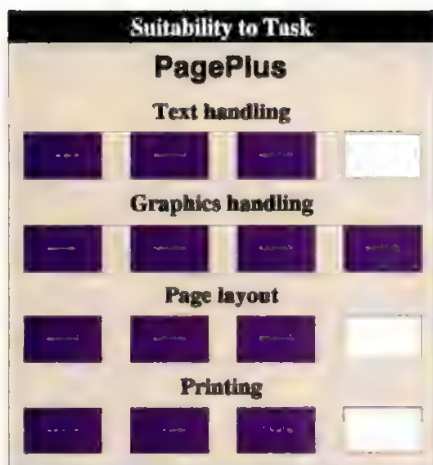
VGA INTEGRA™

VGA BASIC•16™



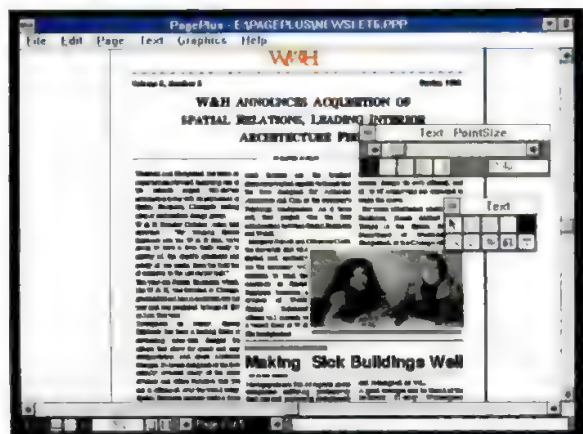
ATI TECHNOLOGIES INC.
3761 Victoria Park Avenue
Scarborough, Ontario
Canada M1W 3S2
Telephone: (416) 756-0718
User Support: (416) 756-0711
Facsimile: (416) 756-0720

Copyright © ATI Technologies Inc., 1992. All company and/or product names are trademarks and/or registered trademarks of their manufacturers.



ify the original file, then repeat the import. In addition, the program lacks a way to use tabs. We had to use several text blocks to create the table in our test newsletter, which made alignment difficult. There is also no way to place a first-line indent on a paragraph automatically.

Our experience with the test newsletter showed that getting adjacent columns



Text handling is one of the areas where PagePlus excels. The Property Panel floating toolbar makes it easy to fine-tune text attributes and spacing.

to align is almost impossible, because PagePlus has no point of reference between frames. If you mix fonts, type sizes, or attributes like bold and italic in the same frame, you may have problems.

On the positive side, PagePlus yields output that closely matches its screen display; it did produce some inexplicable artifacts in printing, though. Its screen redraws were acceptably fast, and its print times, while the second slowest, were not unbearable.

Its flat learning curve, low price point, and friendly interface make PagePlus an

GRAPHICS LOW-COST DTP

excellent choice for those wanting a basic page-layout program. The single-frame design and limited layout-handling features make it less suitable for producing long documents.

TIMEWORKS INC. Publish-It!

Two years ago, Timeworks' *Publish-It!* (\$149.95) received our Editors' Choice award, but time has not been kind to this package. It has well-designed dialog boxes, speedy screen redraws, and *Ventura Publisher*-like formatting controls, but its limited graphics handling, lack of true scalable fonts, and aging GEM interface limit its appeal for more demanding projects.

Publish-It!'s strong suits are easy frame-based layout and global paragraph control. It's easy to get a constant style and stick to it. You choose one of the four modes of operation—frame, paragraph, graphics, or text—based on the type of work you are doing. The easiest way to build a document is to follow a set plan. You draw frames to hold objects, place text and graphics from imported files or with the program's tools, then handle text formatting and cropping graphics. Each object, text file, headline,

or graphic is contained in its own user-created frame; there is no underlying automatic frame on every page as there is in *Ventura Publisher*. You can, however, use the program's Master Pages to create frames for objects that repeat on every page.

Publish-It! does not allow more than one column in a frame, but layout guides make it easy to build precise designs. Other features are also easy to use. Flowing text between frames, for instance, is almost automatic, and the program can build additional pages to handle overflows. To define font, size, leading, hyphenation, bul-

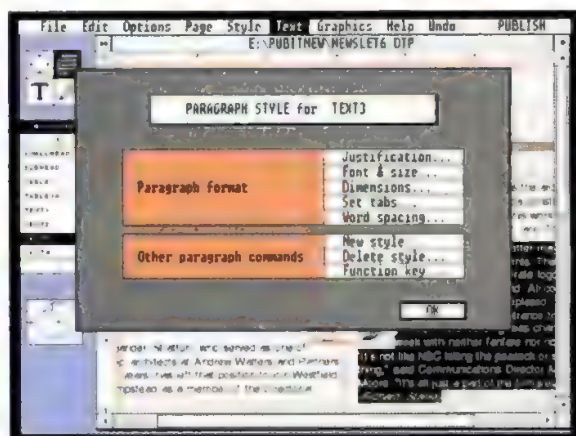
lets, spacing, and justification, you just select the paragraph and choose the desired options from the Paragraph Styles dialog box. You can save styles and apply them to other paragraphs or other publications. The hyphenation works well with full justification and the columns are free of large open spaces.

IMPORT YES, FIT NO

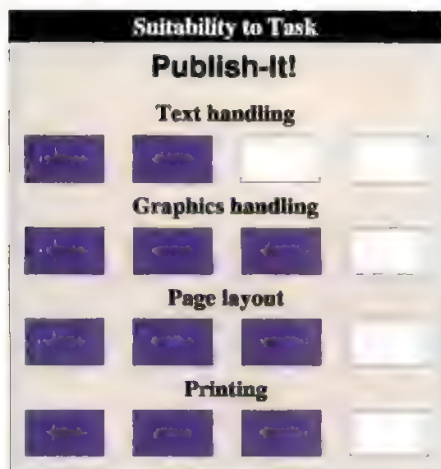
You can smoothly import text or add smaller blocks of text by typing directly into a *Publish-It!* frame. Changing the font in part of a paragraph is simply a matter of selecting the area and choosing the new setting.

Headlines are another matter. Most publishing programs offer true scalable typefaces for their supported printers, but *Publish-It!* cheats: You must generate bitmapped fonts from the supplied outlines using the *Typografica* utility that comes with the package, a time- and disk-consuming process. The limited point sizes supported for the HP LaserJet hampered our ability to fit stories into a given space and made it impossible to fine-tune any of our headlines for a custom fit. There was no way to force the headlines at the top of the columns on pages 2 and 3 of our test newsletter to exactly cover the first line without jamming letters on top of each other. In addition, *Publish-It!* offers no method for rotating text like "Noteworthy News" on page 4.

Graphics handling is equally awkward. *Publish-It!* can import gray-scale and color TIFF images, but it can't print them, and the program is not much good at sizing pictures. When we tried to size a picture to occupy a column and a half, it just didn't



It's easy to create paragraph styles with Publish-It! You can define font, size, leading, spacing, and justification from a single dialog box.



work. If you need to place pictures in your documents, plan on pasting in halftones by hand, or use another program.

The only really slick graphics feature is Text-Runaround, which lets you set the padding (white space) separating a graphic from the surrounding text. You can define irregular wraps by clicking on the border with the mouse and pulling the line into any shape you wish.

PROBLEM PRINTING

The lack of type-fitting controls and a full range of font sizes made a mess of our stringent layout. Without gray-scale support and proper sizing controls, pictures did not fit or print properly. Both our pho-



Publish-It!, Version 2.0

Timeworks Inc., 625 Academy Dr., Northbrook, IL 60062; 708-559-1300
List Price: \$149.95.

Requires: 640K RAM, hard disk, GEM-supported display adapter and monitor, mouse

In Short: Basic layout and paragraph formatting are easy with *Publish-It!*, but the GEM-based interface is showing its age. Tight memory, limited graphics support, and a lack of true scalable fonts make this a program in need of an overhaul.

CIRCLE 400 ON READER SERVICE CARD

GRAPHICS LOW-COST DTP

tographs show a pronounced moiré pattern. However, the print was clear and easy to read, and *Publish-It!* proved to be one of the fastest programs in our printing tests.

Publish-It! has other problems that stem from its GEM interface. In particular, beware of memory crashes when changing views; you may suddenly get dropped

back to the DOS prompt. There is an auto-save feature, which can usually recover your work, but that's like selling an airplane with the promise of a wonderful ejection seat.

Publish-It! suffers from the limits of the aged GEM environment and its inability to handle modern graphics. The program needs a major overhaul before it's worth buying. Perhaps the move to Microsoft Windows will help. ■

THE BEST BUYER'S GUIDE ON COMPUTING IS ON YOUR COMPUTER.

ZiffNet, the on-line information service all about computing, gives you everything you need to make the right buying decisions. Like specs for every available product on the market. Winners of awards including Editor's Choice. Product reviews from dozens of magazines going back three years. And forums that let you ask the experts at Ziff magazines for advice. Just call 1-800-666-0330 for more information on how to sign up. Because when you're on-line, you're on to the latest buying information.

Ziff NET

ALL ABOUT COMPUTING...ON-LINE

CompuServe and ZiffNet members type GO ZNT:BUYRESOURCE ©1992 Ziff Communications.

CIRCLE 074 ON READER SERVICE CARD

PROTECT YOUR COPIES OF PC MAGAZINE

Make your collection of *PC Magazine* a handsome addition to your office or home—and protect and organize your copies for easy reference!

PC Magazine Binders and Cases are made of durable, luxury-look leatherette over quality binder board. Custom designed for *PC Magazine*, every order receives FREE transfer foil to mark dates and volume numbers.

FOR FAST SERVICE CALL TOLL-FREE 1-800-825-6690

MAGAZINE BINDERS

Hold your issues on individual snap-on rods. \$9.95 each; 3 for \$27.95; 6 for \$52.95.



OPEN BACK CASES

Store your copies for individual reference. \$7.95 each; 3 for \$21.95; 6 for \$39.95.



PC MAGAZINE

Please send ☐ Binders ☐ Cases Quantity _____
Payment enclosed \$_____. * Add \$1 per case/binder for postage & handling. (Outside USA, add \$2.50 per case/binder ordered, US currency only.)

Charge my: ☐ Amex ☐ Visa ☐ MC (Minimum order \$15)

Card No. _____ Exp. Date _____

Mr./Mrs./Ms. _____ Please Print Full Name

Address _____ No P.O. Numbers Please

City _____

State _____ Zip _____

* PA residents add 6% sales tax.



a-Si It's practically Sci-Fi.

Introducing
the Kyocera
ECOSYS
a-Si Printer.



It's the aSi (amorphous silicon) based page printer that can save the day for your enterprise. In fact aSi is the driving force behind all the ECOSYS features, performance and above all, a total operating cost that puts this printer in a world by itself. Its aSi imaging technology has resulted in a print engine so long lasting that the drum, developer and fuser system may never need changing. So compact, ECOSYS features one of the smallest footprints... but it's also one of the most upgradable workgroup network printers of its kind—anywhere!

KYOCERA ELECTRONICS, INC.
100 Randolph Road
Somerset, NJ 08875

Star Date 1992, ECOSYS utilizes a unique, image enhanced LED scanning design plus Ecotone; the breakthrough microfine ceramic toner that continually cleans and reconditions the aSi engine.

What's more, because you literally only have to "add toner", no other consumables, ECOSYS reduces the vast environmental problems disposable laser cartridges create.

And ECOSYS costs less than a penny a page to operate. Compare that to your laser cartridge costs. Sci-Fi is now Sci-Fact!

For more information
regarding the ECOSYS aSi Printer
call: 800-323-0470.

ECOSYS
a-Si PRINTER™
For the working environment and the living environment.

Label and Envelope Printers

EASY ADDRESSING



PHOTOGRAPHY: THOM O'CONNOR

These six label and envelope printers from Avery, CoStar, Eltron, Seiko, and Tidemark provide good if not letter-quality output and enough performance to produce 1 to 100 labels or up to 50 envelopes at a time. Three of the label printers are priced under \$300 and one of the envelope printers costs less than \$600.

It is no secret that printing envelopes and labels can be a headache. Trying to print a single envelope or a single label—to go on an envelope, file folder, or floppy disk—can be one of the most frustrating and unenjoyable chores. That's why you can find offices with state-of-the-art printers, word processing software—and a typewriter for addressing individual labels and envelopes.

by M. David Stone

Enter label and envelope printers. Both types of products focus on printing single addresses, though most can also be used for printing mailing lists, and some can even handle standard bar codes. They typically come with software to let you create your own envelope or label formats as easily as possible.

REVIEW CRITERIA

For this overview, we required label and envelope printers with a list price of \$1,500 or less (often far less), and each had to include its own software. We found four direct thermal label printers that fit the review criteria: The \$279.95 Avery Personal Label Printer, the \$249.95 CoStar LabelWriter II, the \$1,392.95 Eltron LP-2042, and the \$199.95 Seiko Smart Label Printer Plus. We also found two envelope printers: The \$595 8-pin dot matrix CoStar AddressWriter and the \$1,195 ink jet Tidemark Address Express.

Not included in this overview are the \$1,200 Avalon BARacuda, and Cognitive Solutions' \$1,195 PD1520 and \$1,395 DT2420. None of these printers include software, although you can write your own code for issuing commands to them. The \$1,390 Mars MEQ1622 (from Cognitive Solutions, the OEM), also is not included because it does not come with software.

By and large, the label printers we reviewed are ideal for printing one label at a time, and most are appropriate for printing up to 100 labels at once. Similarly, the envelope printers are designed for printing one or a few envelopes at a time, and depending on how long you're willing to wait, are adequate for midsize jobs of 50 envelopes or more. Most of these label and envelope printers are not, however, designed for large runs, nor can they print multipart shipping forms. (For a review of higher-priced, higher-volume envelope printers, see "Name and Address for Less: Envelope Printers Cut Your Costs," *PC Magazine*, January 29, 1991.) While the Eltron and the two envelope printers can handle large packing mailing labels—roughly 4 inches square—the other three cannot.

The six printers we reviewed have many features in common. Most of these packages include memory-resident software, which you can load before your word processor or other application for capturing data to print to the label or envelope printer, even while your document printer is active. Eltron's software, however, is

strictly foreground. In fact, the Eltron differs from the competition in another important respect: While most of these printers mainly handle mailing labels, the Eltron is best described as a near-industrial-strength, high-volume bar code printer that can also handle mailing labels.

With the exception of the Eltron label printer, the products reviewed here can print Postnet bar codes but few or no

standard bar codes, such as Code 39, UPCA, and UPCE. Postnet is a bar code designed by the United States Post Office to encode ZIP codes; the Post Office insists that using these will speed your mail delivery. The two envelope printers can also print FIM (Facing Identification Marks) codes; these are lines at the top of the envelope that help the post office sorting equipment find the Postnet codes.

The Eltron handles ten standard bar codes (excluding Postnet), making it a

HIGHLIGHTS: Label and Envelope Printers

- The majority of these four label and two envelope printers are ideal for outputting single addresses and appropriate even for midsize mailing lists (about 50 envelopes or 100 labels at a time). They include software, and all but one use a serial connection.

- Three of the four label printers cost less than \$300 each. The \$595 CoStar AddressWriter, an envelope printer, is only slightly more costly. The \$1,392.95 Eltron LP-2042 label printer and the \$1,195 Tidemark Address Express envelope printer are at the higher end of the price spectrum. (For mailings in the hundreds or thousands, see our review of \$3,000 to \$5,000 higher-end envelope printers, "Name and Address for Less: Envelope Printers Cut Your Costs," January 29, 1991.)

- All but the Eltron LP-2042 support Postnet, a bar code designated by the United States Post Office to encode zip codes and speed mail delivery. The envelope printers also support Facing Identification Marks codes—lines at the top of the envelope that help the post office sorting equipment find the Postnet codes.

- While the other products provide few or no standard bar codes, the Eltron LP-2042 supports ten different codes. In fact, this printer is best described as a high-volume bar code printer, nearly industrial-strength, that can also handle mailing labels.

- By using the memory-resident software that comes with most of these

products, you can capture an address from your word processor or other application and output it directly to the label or envelope printer. The software is generally more convenient and flexible than the label or envelope printing capabilities available with a few word processors and other programs.

- Among the label printers reviewed, 1.1- by 3.5-inch labels are most popular. The majority of label printer vendors currently offer white labels only. By the time you read this, transparent labels should also be available.

- The CoStar AddressWriter and Tidemark Address Express envelope printers reviewed here accommodate standard business-size envelopes, postcards, and equivalent-size stock, including large single labels.

- If you have a dot matrix printer, consider a label or envelope printer if you dislike loading and unloading continuous-form labels, or if your dot matrix does not print envelopes readily. You may also be a candidate for a label or envelope printer if you own a laser printer but typically don't print a whole sheet of labels at one pass, or if your laser printer is limited to feeding single envelopes manually and you would prefer a more-cost-effective alternative to buying a new printer and envelope feeder.

- In general, label printers are faster than envelope printers, but envelope printer output is more aesthetically pleasing. Labels make your letters look like part of a bulk mailing.

potential choice for any application that can benefit from a bar code reader. You can use bar codes for taking inventory, tracking tapes at a video store, or keeping records of your wine cellar contents. If you think you can benefit from using bar codes, you will have to match the bar code

to your needs. Some bar codes only code numbers; others code numbers and uppercase letters. Still others code numbers, uppercase, and lowercase letters. Most industries have standards for the bar codes

they use; for example, UPC-A is the standard for items on sale to the public.

EASY INSTALLATION

All except the Eltron are strictly serial printers that come with a serial cable. The Eltron is available with a parallel port,



EDITORS' CHOICE

■ CoStar AddressWriter

The six products that are reviewed here cannot directly compete with each other on all levels. Envelope and label printers are, for the most part, different animals. In addition to satisfying your mailing address needs, label printers can also create labels for floppy disks, file folders, or just about anything else. One of these label printers, the Eltron LP-2042, is best suited for printing bar codes, though the promise of Postnet support in an upcoming version will boost its low-level mailing address capabilities.

Envelope printers generally can also print on postcards and even envelope-size single labels in addition to envelopes, but their primary purpose is to print addresses. When it comes to mailing important letters, one advantage an envelope printer has over a label printer is output that looks more professional and personal than does a white label stuck on an envelope, though transparent labels come closer to the ideal.

With this in mind, the \$595 CoStar AddressWriter is the best choice of the group for handling mailing addresses. While its cost is about twice that of most label printers we reviewed, it is half the price of the Tidemark Address Express. Its dot matrix near-letter-quality output cannot compete with high-end laser output, but it is crisp and looks professional. An ink jet printer, the \$1,195 Address Express, provides better output—approaching letter quality—but is not on a par with a laser printer or even an HP DeskJet. We expect

more from a system costing this much.

Almost none of the reviewed products offer the kind of performance you would demand of a high-volume output device, nor were they meant to. On the whole, they are better suited for small or medium-size print jobs (no more than 100 labels or 50 envelopes at a time). Not surprisingly, even the slowest label printer is faster than the Address Express and the AddressWriter. But between the two envelope printers, the AddressWriter, operating in normal-quality (correspondence) mode, proved the faster device. The Address Express is more competitive when the AddressWriter is operating in high-quality mode, but in general it is not markedly so.

The AddressWriter software does not have as many bells and whistles as some competing offerings—you can't, for example, print graphics or generate fonts. But it does have all the basics you need to get the job done, such as the ability to capture addresses from other programs, read addresses from a data file, and maintain its own database of names and addresses; best of all, it is easy to use. All in all, the AddressWriter merges a good price, fine output, and easy operation into one winning package.

ALTERNATIVE CHOICES

If a lower price is your main priority, if you need bar code capabilities beyond Postnet (something neither envelope printer provides), or if you want to be able

to print on 1.1- by 3.5-inch labels, you might be better off with one of the four label printers reviewed in this feature.

Among the label printers, the CoStar LabelWriter II represents a good choice. At \$249.95, it is not as inexpensive as the \$199.95 Seiko Smart Label Printer Plus but is slightly less costly than the \$279.95 Avery Personal Label Printer. A shade faster than the Avery offering and a rocket ship compared with the Seiko, the LabelWriter II also provides easy-to-use software: While *LabelWriter II* may not be as feature-filled as Avery's combination *LabelPro* and *PLP* software, it has the advantage of being packaged in a single, tightly integrated offering.

With the LabelWriter II, you can also print a 12-point four-line address and Postnet bar code, which makes for better-looking labels than the 10-point font the Personal Label Printer is forced into for printing Postnet bar codes. Like its Address-Writer sibling, the Label Writer II had some problems with *WordPerfect's* latest PostScript driver. But that aside, the Label Writer II is a well-rounded, well-designed package.

We should also say a word about the most expensive label printer we saw—the \$1,392.95 Eltron LP-2042. This is really a bar code printer that also does mailing labels. Don't choose it if creating mailing labels is your primary mission, but if you require speeds that are nearly industrial-strength, a resolution of 203 dots per inch, and a plethora of bar code options, put this one on your list.

serial port, or both (as on the unit tested). The software works only through the parallel port, though. To run the printer through the serial port, you must write your own software or find third-party software that supports serial printing for the Eltron. Installation for all the printers primarily consists of plugging in the cable and power cord, copying the software to the hard disk, and setting the software for the appropriate port.

The CoStar AddressWriter accommodates envelopes up to 10.5 inches in length and 4.3 inches in height; the Tidemark can also accept envelopes up to 10.4 inches wide and 6.3 inches long. This handily covers the most common envelope sizes. Both can also accept postcards and equivalent-size stock, including large single labels.

The most popular label size for the label printers we review in this roundup is 1.1 by 3.5 inches. The Eltron LP-2042, however, is a wide-carriage device capable of handling labels up to 4.3 inches wide, though it can also accommodate the smaller, 2.3- by 1.3-inch labels we used on our benchmark tests.

All these label printer manufacturers can supply you with their own labels; by the time you read this, you will be able to

PRINTING LABELS: Choosing the Software Alternative

If you want to print labels, you don't have to buy a new output device. Here are five software products that bring label printing capabilities to your current laser or dot matrix printer.

by M. David Stone

If you already have a document printer you can dedicate to labels or envelopes, or if you simply don't need that convenience, you can find any number of programs that will let your current printer create labels.

The possibilities include programs limited to printing bar codes, those that handle only text, and those that allow some combination of bar codes, text, and graphics. Some are foreground programs meant for large print jobs, while others are TSRs that will capture an on-screen address and print a single label or envelope. You can also opt for simple database managers, such as Group 1 Software's \$695 *ArcList*, Useful Software's \$99.95 *Books, Cards, and Labels*, and Buttonware's \$69.95 *TakeNote*, that happen to include special support for labels and envelopes. Another choice for printing mailing labels, which we will cover in the May 26 issue's story on database publishing, are report writers such as the \$249 Concentric Data System *R&R Report Writer*. Most major databases, such as *DataEase*, *dBASE*, *Paradox*, and *R:BASE*, also include rudimentary support for printing labels.

Following is a sample of some of the software alternatives available. They vary not only in capability but also in price. The products ranged in price from almost \$90 to nearly \$500, more than the cost of some of the label printer packages in the main review!

LABEL MASTER

If you need to print bar code labels, and particularly if you need them as part of a complex format, StrandWare's \$479 *Label Master*, Version 1.31, is one of your most capable—and

expensive—choices. This menu-driven foreground program includes a WYSIWYG layout editor that will let you mix bar codes, text, and graphics, as well as add lines, boxes, and background shading. With it, you can rotate the layout, insert data from up to two data files (in *dBASE*, *.DIF*, comma-separated variable, or *.WK1* formats) or input it via a bar-code reading wand, automatically increment or decrement fields by any value, automatically date and time stamp each label, and more.

The program supports over 200 printers, including Epson, HP DeskJet, HP LaserJet, IBM, and PostScript printers. It also supports high-end bar code label printers, such as the Avalon Design BARacuda.

Label Master can print 17 different bar codes (18 if you count Postnet). Unfortunately, it does not support every bar code on every printer, but in a welcome show of attention to detail, fully half the manual is devoted to spelling out which features *Label Master* supports on each printer. One minor annoyance is a hardware copy-protection key that you have to plug into a parallel port, but if you need to print bar codes and you are willing to live with that, the program provides an impressive set of features.

LABELPRO LASER AND LABELPRO DOT MATRIX

Much like a razor manufacturer that all but gives away its razor so it can sell you the blades, Avery has designed its *LabelPro* software with its own labels in mind. *LabelPro Laser*, Version 1.60, is designed for Avery's laser printer labels, cards, and transparencies; it supports most laser printers. *LabelPro Dot Matrix*, Version 1.0, is for Avery's continuous-form products and supports most dot matrix printers. Each version sells for \$99.95.

With both programs, the first step in label design is to choose a label format from the list of Avery forms. The programs provide an on-screen representation of each form, which means you can match each to other brands of labels, but it is certainly far easier to read Avery's product code on the label box and pick the number from the list. For each choice, the programs provide several layouts for positioning text and graphics. You choose the layout and then define the details for each label.

The two programs differ slightly on certain features. For example, the laser version offers Code 39 and Postnet bar codes, neither of which is supported in the dot matrix version. But both are strictly foreground programs and share the ability to add graphics in *.PCX* format and merge data from *dBASE*, *WordPerfect*, or in a comma-separated variable

buy the new, transparent labels (in addition to the standard white-issue kind) from Avery, CoStar, and Seiko. Most of the vendors can supply you with 130-label rolls, though CoStar also offers rolls of 350 labels. Depending on the vendor, two rolls of 130 white labels will cost you from \$8 to \$13; transparent labels can range from almost \$10 for a one-roll package to nearly \$15 for a two-roll package.

DO YOU REALLY NEED ONE?

How much you can benefit from these packages depends a lot on the printer and software you already have. As a point of comparison for these reviews, PC Magazine Labs ran hundreds of envelopes through the envelope feeder attachments for an HP LaserJet IIID and IBM LaserPrinter 10. (The envelope feeder for the

LaserPrinter 10 has a 50- to 75-envelope capacity; the LaserJet IIID's feeder has a 50-envelope capacity.) We also ran hundreds of labels through the standard feeder. Both handled the tasks without problems, which makes them a match for the printers in this overview. If your printer handles envelopes or labels this well, you may not need anything else.

Keep in mind, however, that label manufacturers warn you not to put a label

format as well as from the program's own database. Either version is a good choice for printing lots of labels.

LABELS UNLIMITED

Power Up Software Corp.'s \$89.95 *Labels Unlimited*, Version 3.0, is similar in capability to Avery's *LabelPro* but different in structure. One key difference is that the program offers predefined formats not just for Avery labels but also for labels from 3M and others, plus the ability to user-define still more formats. Another difference is that it supports dot matrix and laser printers in the same package, including Epson, HP DeskJet, HP LaserJet, and IBM.

Notably absent from *Labels Unlimited* is any PostScript support, and also missing is the ability to print bar codes or print from *dBASE* files. The program, however, can print .PCX files and can merge data in comma-separated variable formats, as well as other ASCII formats and lists maintained in the program itself.

Defining label formats in *Labels Unlimited* is much like defining them in *LabelPro*. But instead of maintaining data separately from the formats, *Labels Unlimited* stores both together and lets you vary the format for each item in a list. The result is less like a database than like a list you could maintain in a word processor. For some, this will count as an advantage that yields increased flexibility.

LASER SINGLES WITH NVELOPE PLUS

MACO's *Laser Singles with Nvelope Plus*, Version 1.20, is a \$114.99 combination pack with 250 labels for laser printers (the "Laser Singles"), and software (*Nvelope Plus*) that can print on those labels, or on envelopes and other standard label formats. This is the only product of the five that will print on envelopes.

The labels included in the package are the same Laser Singles mentioned in the introduction to this article; a single label sheet holds only a single 3.4- by 4.3-inch label. The software is a TSR package that will let you grab an address or other information from the screen by defining the capture area manually, then print that address on the Laser Singles labels or on a wide variety of other predefined or user-defined envelope and label formats.

The *Laser Singles* software supports Canon, Hewlett-Packard, and PostScript laser printers, Epson and IBM dot matrix printers, and will let you custom define a driver for others. You can store captured data in the program's database, paste data from the database into another application, maintain multiple lists of data, and print all or part of any

list—though you have to tag items manually for a partial printout. You can also import data from a comma-separated variable or fixed-field ASCII format. As an extra, you will find a database of ZIP codes that also includes commands for UPS ground, next-day, and second-day service. Surprisingly, there is no support for Postnet or other bar codes. Still, this is a good choice if you are looking for a program primarily for printing addresses.

These programs are not directly comparable. If you need to print bar codes, *Label Master* is the obvious choice; similarly, *Laser Singles with Nvelope Plus* is the way to go if you need to print on envelopes or if you need a single label per sheet. For easy printing of mailing labels, both *LabelPro* and *Labels Unlimited* are good choices, though keep in mind that the latter lacks PostScript support.

Label Master

StrandWare Inc., P.O. Box 634, Eau Claire, WI 54702-0634; 800-552-2331, 715-833-2331. **List Price:** \$479.

Requires: 512K RAM (for designing labels), 256K RAM (for printing labels); 2MB hard disk space; DOS 3.0 or later; Hercules, CGA, EGA, or VGA monitor; parallel port.

CIRCLE 470 ON READER SERVICE CARD

LabelPro Laser, Version 1.60

LabelPro Dot Matrix, Version 1.0

Avery Commercial Products Division, 818 Oak Park Rd., Covina, CA 91724; 800-462-8379, 818-915-3851. **List Price:** \$99.95 each.

Requires: 470K RAM; 3MB to 5.3MB hard disk space; DOS 3.0 or later; graphics monitor.

CIRCLE 471 ON READER SERVICE CARD

Labels Unlimited, Version 3.0

Power Up Software Corp., 2929 Campus Dr., San Mateo, CA 94403; 800-851-2917, 415-345-5900. **List Price:** \$89.95. **Requires:** 512K RAM, DOS 3.0 or later. Hard disk recommended.

CIRCLE 472 ON READER SERVICE CARD

Laser Singles with Nvelope Plus, Version 1.20

MACO Tag and Label, 225 Long Ave., Hillside, NJ 07205; 800-221-9983, 201-923-1200. *Nvelope Plus* available from

Cajun Edge, P.O. Box 2457, Hammond, LA 70404; 800-448-2970, 504-294-2803. **List Price:** With labels, \$114.99 from MACO; *Nvelope Plus* without labels, \$79.99 from either MACO or Cajun Edge. 250 labels from MACO, \$35.44. **Requires:** 256K RAM, DOS 2.1 or later.

CIRCLE 473 ON READER SERVICE CARD

ASSESSING PRINT QUALITY

Good print quality is as important for a label or envelope printer as it is for a document printer. But good print quality is a relative term. You should not expect the output of the label or envelope printers we review here to match that of your laser printer (compare their output against the sample 12-point Univers output from an HP LaserJet III, below). For

one thing, all but the Tidemark Address Express use less sophisticated dot matrix technologies (either impact or thermal dots placed together to form a letter), and the Tidemark's ink jet technology is low-density. It prints at 192 dots per inch, while high-density ink jet printers, such as the HP DeskJet 500, print at 300 dpi.

Here we show sample output for all six reviewed printers: Avery Personal Label Printer, CoStar Label Writer II, Eltron LP-2042, Seiko Smart Label Printer Plus, CoStar AddressWriter, and Tidemark Address Express. The output reflects the optimal combination of speed and quality—the combination that the majority of users will likely use most often. In all cases except for the Tidemark Address Express and the Seiko Smart Label Printer Plus, we show the output obtained when the printer is operating in high-quality mode. The Seiko unit's output reflects printing in normal-quality mode. The Tidemark prints in only one mode.

As you can see from the print samples, all the dot matrix printers produce char-

acters with the "jaggies" (jagged edges in the curves). In some cases, however, it is less noticeable. The CoStar AddressWriter, for example, is unique among these products because it uses an 8-pin dot matrix printhead and several passes over the envelope to produce what passes for letter-quality in the dot matrix world. This results in dark, fully formed characters that show just the slightest hint of the "jaggies."

While the Tidemark's ink jet technology results in fewer jagged edges, the output suffers from the fuzziness commonly associated with low-density ink jet printers.

When viewing the sample output, you can best see characteristics like jaggedness and fuzziness on any character with both horizontal and vertical segments, as well as curved components like the ones making up the letter *P* or *R*. We have enlarged the letter *P* 500 percent (five times larger than normal size) so that you can clearly see the way the printer handles straight lines and if there are too many jagged edges in the curves.

HP LaserJet III

Arthur D. Au
PC Magazine
One Park Ave
New York, N

PC

The \$2,395 HP LaserJet III offers smooth output. Jaggedness is not visible to the naked eye; the characters are well formed and well rounded.

Avery Personal Label Printer

Arthur D. Au
PC Magazine
One Park Ave
New York, NY

PC

With the \$279.95 Avery Personal Label Printer, you must use a 10-point font to fit four address lines and the Postnet code onto a label. Jaggedness is most apparent on the loop of the *P*.

CoStar LabelWriter II

Arthur D. Au
PC Magazine
One Park Ave
New York, N

PC

While the \$249.95 LabelWriter II suffers from the jaggies, it can accommodate a four-line address and a Postnet bar code in a roomier 12-point font. This gives it an edge over the Avery.

Eltron LP-2042

Arthur D. Au
PC Magazine
One Park Ave
New York

PC

At 203 dots per inch, the \$1,392.95 Eltron LP-2042 boasts fairly smoothly formed characters. No fuzziness or dots are present, but the characters' corners are not rounded.

Seiko Smart Label Printer Plus

Arthur D.
PC Magaz
One Park
New York,

PC

The \$199.95 Seiko produces reasonably good print, with less jaggedness. But the dots that form each letter are slightly more obvious. HP LaserJet III output is shown for comparison; the letter *P* is enlarged 500 percent.

CoStar AddressWriter

Arthur D.
PC Magaz
One Park A
New York,

PC

The \$595 CoStar AddressWriter has relatively smooth output and good letter formation. Neither excessive jaggedness nor fuzziness mars the characters.

Tidemark Address Express

Arthur D. Au
PC Magaz
One Park A
New York, N

PC

The fuzzy quality of the \$1,195 Tidemark Address Express's output is visible in the loop of the letter *P*. Notice, however, that it is less jagged.



Judge it by its performance. Buy it for its price.

The new LBP®-4 LITE is the most affordable state-of-the-art Laser Beam Printer from the people who perfected the art.

As with all Canon Laser Beam Printers, it gives you the ability to produce high-quality documents with outstanding type resolution and graphic power.

And like the other members of the Canon family, the LBP-4 LITE has the famous Canon replaceable cartridge that makes it compact, reliable, and virtually maintenance free. Plus you get built-in scalable fonts for greater type

flexibility. And you even have the option of choosing genuine Adobe® PostScript®.

If you need even more capabilities, other Laser Beam Printers in the Canon family have them. From Automatic Image Refinement, which smooths edges and curves for more professional graphics, to dual cassettes for high-volume or dual-sided printing.

Which of our state-of-the-art printers is right for you? Judge for

yourself. Call the people who perfected the art. 1 (800) 848-4123.

In Canada, call 1 (800) 387-1241.



LBP-4 LITE

LBP-4 PLUS

LBP-8 Mark III TT PLUS

LBP-8 Mark III TT

LBP-8 Mark III R



Canon® and LBP® are registered trademarks and Mark III, Mark III T and Mark III R are trademarks of Canon Inc. Adobe® PostScript® and the PostScript logo are registered trademarks of Adobe Systems Inc., in the U.S.A. © 1992 Canon U.S.A., Inc.

CIRCLE 155 ON READER SERVICE CARD

Canon

sheet through a laser printer more than once or the label might come off inside your printer (a messy, potentially damaging, and time-consuming problem). You should certainly limit yourself to label sheets designed for laser printers. While our informal tests indicate that you're probably safe putting a label sheet through a laser printer several times, you have to ask yourself how willing you are to take this chance. While you can get laser label sheets with one label each, like MACO's Laser Singles, these are expensive. They cost \$35.44 for 250 labels and have a street price of about \$20 for a package of 3.4- by 4.3-inch labels. Unless you're primarily involved in print jobs where you can make use of entire sheets of labels at once, using a label printer is a safer and ultimately cheaper choice.

With dot matrix printers, the issue is the time and inconvenience involved in loading and unloading continuous-form labels. The break-even point depends on how many labels the label printer can print in the same amount of time it would take to load continuous-form labels on your dot matrix printer, print the same number of labels, and then reload the standard-size paper.

Even if your laser printer handles single envelopes well, but is limited to being fed manually, any of the packages reviewed here can be a cost-effective alternative to buying a new document printer plus an envelope bin. (As a point of comparison, the feeders for the LaserPrinter 10 and LaserJet IIID cost \$379 and \$350, respectively.) Also keep in mind that, unlike the IBM LaserPrinter 10 and HP LaserJet IIID, some have envelope feeders that don't attach to the printer. If that is the case with your system, the hassle involved in continually reinstalling the feeder may make you want to consider one of the devices reviewed here.

If your printer just flat-out balks at envelopes or labels, the packages reviewed here provide a necessary alternative. Not all printers can feed envelopes or labels easily, and those that can are not always reliable. For example, a laser printer may feed envelopes without problems ten months a year, but during July and August, high humidity often makes envelope printing a game of chance because the envelopes gum themselves.

SOFTWARE ISSUES

The software side of the equation is complex. Most word processors, for example,

can print in virtually any format, but often you have to create the format, specifying the page size and margins each time you print an envelope or label, or write a macro that will handle the task for you. Similarly, most word processors will let you merge a data file to let you print multiple labels in any format, such as label sheets with three labels across.

The catch is that with many major word processors, you have to know your word processing software extremely well to handle these tasks, and you have to invest the time to set up the macros or merge. You can get the same result with far less work by using the software that comes with these printers. There are exceptions to this, of course. *WordPerfect 5.1* comes with a useful but somewhat confusing macro for printing labels and envelopes, and you still have to know how to use macros to take advantage of either. Even more noteworthy is *Microsoft Word for Windows*, Version 2.0, with its Tools/ Create Envelope command and its merge helper.

If your only problem is with your software, you may want to investigate the label printing options discussed in the sidebar "Printing Labels: Choosing the Software Alternative."

CONSIDERING YOUR NEEDS

Obviously, label and envelope printers are not in direct competition with each other. Besides the price issue (three of the four label printers reviewed are under \$300, compared with the \$595 Address-Writer and the \$1,195 Tidemark), performance, versatility, and quality are also factors.

If you're looking for the best speeds, label printers win hands down over envelope printers. For example, PC Labs' benchmark tests show that on average, label printers can print out a single address without a Postnet bar code in about 5 seconds. The same operation using an envelope printer takes about 17 seconds. Part of the reason label printers have faster performance is that there is less media to move past the printhead. Additionally, label printers have a continuous stream of labels to hold on to, while envelope printers have to worry about maintaining a grip on each individual envelope. Of course, with label printers, there is the additional time required to paste the labels onto envelopes.

As for flexibility, envelope printers have a slight edge in terms of the types of media they will accept—everything from envelopes to postcards to large-size labels. They're tightly focused on printing addresses, however, while label printers are well suited for anything from mailing-address labels to identification labels for the contents of disks, file folders, or just about anything else.

Perhaps one of the biggest differences between the two types of products is an aesthetic one. Simply put, labels have the look of a bulk mailing, while printing directly on envelopes makes them look as if you have individually addressed them. This is especially true if you're using white labels, although the newer and more expensive transparent labels are an improvement. If you intend to use your printer for important mail, looks count.

Whichever option you choose, an important advantage of these products is that they provide you with a printer that is always loaded with envelopes or labels. Sure, you can get almost the same benefit by buying another standard printer and dedicating it to the task, but you won't get the software that comes with these packages. It is the software that very much determines the package's overall convenience; keep this in mind as you read through the following reviews.

The six products are reviewed in two groups: the four label printers first and then the two envelope printers. Within the groups, they are arranged alphabetically by company name.

LABEL PRINTERS

All reviews by M. David Stone

AVERY COMMERCIAL PRODUCTS DIVISION

Avery Personal Label Printer

The Avery Personal Label Printer, from Avery Commercial Products Division, is best understood as a hardware enhancement to Avery's *LabelPro* software. The package has a list price of \$279.95, has an expected street price of around \$210, and comes with the laser printer version of the software and a coupon for the dot matrix version at no additional cost.



It's Time To Think About America's Biggest Business Coverup.



Today's business is covered in paper. It's piled on desks, lost in files and burying good ideas alive. That's why we created WordScan™ and WordScan Plus for Windows. The

award-winning Optical Character Recognition technology that eliminates the slow process of manually typing documents into

your PC. WordScan converts any document into text that can be read by word processing, desktop publishing and spreadsheet programs (no typist can equal 1200 words per minute or our industry leading accuracy). So you can integrate the information into your own work, ready in moments for revisions, retrieval and E-mail. Call us for details.



CALERA
RECOGNITION SYSTEMS

For A FREE Full-Working Evaluation Copy Of WordScan Plus And The Nearest Dealer Location Call (800) 544-7051

Calera Recognition Systems 475 Potrero Ave., Sunnyvale, CA 94086 Outside USA (408) 720-0999 FAX (408) 720-1330 © 1992 Calera Recognition Systems.
Calera® is a registered trademark and WordScan™ is a trademark of Calera Recognition Systems, Inc. All other products and brands are property of their respective trademark holders. Offer valid in USA only.
CIRCLE 053 ON READER SERVICE CARD

Creating borders in Word for Windows was easy for test participants—they simply chose the easy-to-locate "Border" command.

Exotic Excursions
23 Cajun Court
New Orleans, LA 36857

May 15, 1992

Steve Sullivan
8762 W. 180th Pl.
San Diego, CA 98034

Dear Steve:

During the past two years Exotic Excursions has seen a record 200% growth in revenues. This success has been exciting, but we now must adjust for our very fast growth. The size of our office impedes proper customer service and is inadequate for the increased level of store traffic.

- I propose that we open another Exotic Excursions office, since our phenomenal growth of the past three years is likely to continue.
- *Thousands of potential clients will attend the grand opening of the new Exotic Excursions office.*

My staff are currently inspecting some potential locations in the Bay Court Plaza. Rental agents have told us that almost 10,000 people pass through this retail space weekly on their way to offices, restaurants, and shops. The table below shows cost projections for three different space configurations.

Location	Floor	Mezzing	Bath	Street	Cost/Sq.
Court A	4500	N	Y	Main	\$2100
Court B	2100	N	N	Main	\$590
Court C	3400	Y	Y	52nd	\$1000

I recommend that we lease the Court C location. It is substantially...

Build or italics?
It was easy with one click of the mouse.

Creating a bulleted list was two steps in Word for Windows and 12 steps in WordPerfect for Windows.

Word for Windows has an on-screen "Tables" function that lets you add rows almost instantly.

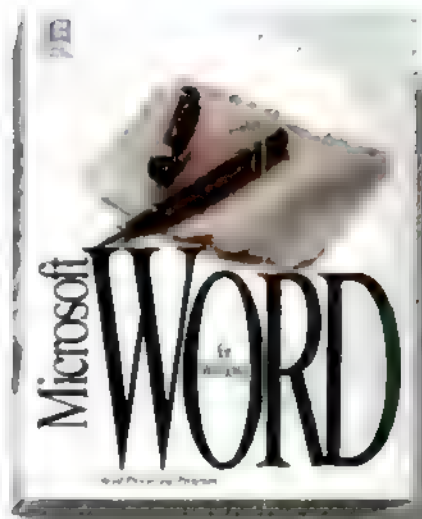
Exotic Excursions
23 Cajun Court
New Orleans, LA 36857

Steve Sullivan
8762 W. 180th Pl.
San Diego, CA 90834

Printing envelopes? Easy. We mean REAL easy. There's an envelope command right on the screen that addresses and prints automatically.

When given this simple letter to revise, WordPerfect for DOS users were impressed at how easy it was to perform everyday word processing tasks using Microsoft Word for Windows 2.0.

No wonder WordPerfect users prefer Word for Windows. It has easy written all over it.



In a recent test conducted by the National Software Testing Labs (NSTL), nearly eight out of 10 WordPerfect® for DOS users preferred Microsoft® Word for Windows™ 2.0 over WordPerfect for Windows. The reasons were plenty.

They were amazed at how Word for Windows put them one step away from accomplishing everyday word processing tasks with, in many cases, one simple click of the mouse. Which may have surprised them. But it didn't surprise us. After all, we designed Word for Windows around them.

Every week during the development of Word for Windows, we invited WordPerfect users to bring in their letters, memos, or whatever business documents they use in their own jobs, and try them out using Word for Windows. Our Product Development

people at Microsoft called these sessions "usability studies." Which is just a fancy, shorter way of saying "what-do-people-use-a-word-processor-for-and-how-can-we-make-it-easier-for-them-to-use-it."

These studies not only helped us to design features that make everyday tasks easier, but helped us to make the more advanced word processing features like grammar checking, drawing and charting, easier to use as well.

See for yourself why nearly eight out of 10 WordPerfect users preferred Word for Windows, and take advantage of our special \$129 offer,* by calling (800) 323-3577, Dept. Y76. If, for any reason, you're not completely satisfied with Word for Windows 2.0, we'll gladly return your purchase in full.** If you'd like, we'll also send you the files you need to test Word yourself. Then you, too, can have the last word on ease.

Microsoft

*Offer good for current licensees of WordPerfect, MultiMate®, WordStar®, MS® Word for MS-DOS® and DisplayWrite®. Please allow 2-4 weeks for delivery upon receipt of order by Microsoft. Offer expires 6/30/92. Limit one per customer. Reseller prices may vary. Call for system requirements. **If you're not satisfied with Word for any reason, return the product to Microsoft within 90 days with proof of purchase for a full refund. Offer good only in the 50 United States. To receive only the NSTL test results: In the United States, call (800) 323-3577, Dept. Y76. For information only. In Canada, call (800) 563-9048, outside the U.S. and Canada, call (206) 936-8661. © 1992 Microsoft Corporation. All rights reserved. Printed in the USA. Microsoft, MS, and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. WordPerfect is a registered trademark of WordPerfect Corp.

Avery buys the printer from CoStar Corp., and it is physically identical to the CoStar LabelWriter II, described in the following review. The Avery is limited to labels measuring 1.1 by 3.5 inches, which Avery sells for \$12.95 for two rolls of 130 white labels; a roll of clear labels (which were set to ship in April) will sell for \$9.95. The printer can also use CoStar's labels, including the 350-label rolls. Avery plans to offer a wide-upgrade option to allow the Avery to use 2.3- by 4-inch labels, but the price for this option was undetermined at press time.

LABELPRO SOFTWARE

Avery's *LabelPro*, Version 1.51, is well suited for small print jobs. For large print jobs, you can take advantage of *LabelPro*'s ability to print large numbers of labels easily and more quickly on your laser or dot matrix printer (this is explained more in the sidebar "Printing Labels: Choosing the Software Alternative").

Among *LabelPro*'s features are the ability to add graphics to labels and to maintain and print from a simple database. But it is strictly a foreground program; you can't use it for tasks like printing an address label while also printing a letter from your word processor. For functions like these, Avery provides a separate TSR utility, *PLP*, Version 1.01.

The TSR program can read label formats defined in *LabelPro* (in fact, you must use *LabelPro* to define the formats), but that is the only information the two programs share. You cannot, for example, use *PLP* to read an address from a *LabelPro* data file and then print it.

Even within its restricted domain, *PLP* is surprisingly limited. If you set it to capture an address automatically, it will monitor data going to your document printer and will capture the first address it finds. Unfortunately, you cannot set it to capture the second address instead, which makes the feature useless if you wish to print your return address rather than use a preprinted letterhead. There is an option, however, to capture text from the screen, which requires you to define the capture area manually via highlighting.

Since the *PLP* program can monitor

text data sent to your document printer for capturing addresses, the document printer and the Avery label printer work in tandem. On PC Magazine Labs' benchmark tests, *PLP*'s print capture worked without problems with Version 5.0 of *Microsoft Word* and *WordPerfect 5.1* when the software was set for an HP LaserJet document printer. It also

worked with *Word*'s PostScript driver. It would not capture properly from *WordPerfect*, however, using *WordPerfect*'s most recent PostScript driver.

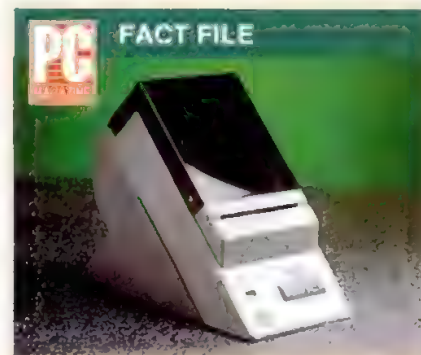
You must install the *LabelPro* software for a standard (document) printer. But when we had it installed for a PostScript document printer, *LabelPro* refused to print to the label printer. It had no problems when the document printer was an HP LaserJet.

Avery confirmed both problems and said it will have addressed them by the upcoming release; current owners of the printer can call for a free disk that will fix the problems. The company also says that the current version of the TSR utility works with older *WordPerfect* PostScript drivers.

PERFORMANCE AND POWER

The TSR's print speed is more than acceptable for printing labels one at a time. A four-line address in a 10-point font takes about 3.5 seconds without a Postnet bar code and 4.1 seconds with one.

Printing one label at a time is a job best handled by *PLP*, since as a foreground program, *LabelPro* cannot pop up to output a label for a letter you're typing on your word processor. And if all you want to do is print one label for a folder, for example, it is easier to just load the TSR. But when *LabelPro* is printing multiple labels to the Avery device, the printer manages 84 labels in 5 minutes without the Postnet code and 81 labels with the Postnet code, which works out to well under 4 seconds per label. To print mailing lists, you must use *LabelPro*; you can use a *LabelPro* database or merge files from *dBASE*, a comma-separated variable format (a common database for-



Avery Personal Label Printer

Avery Commercial Products Division, 818 Oak Park Rd., Covina, CA 91724-3624; 800-462-8379, 818-915-3851.

List Price: With printer, DOS or Mac software, PC or Mac serial cable, one roll of labels, \$279.95.

Requires: 470K RAM (for *LabelPro*) or 64K RAM (for *PLP*); 3MB to 5.3MB hard disk space; Hercules, CGA, EGA, VGA, MCGA, or other graphics adapter; serial port; DOS 3.0 or later.

In Short: The Avery Personal Label Printer includes *PLP* for printing labels while working in another program, plus Avery's foreground-only *LabelPro*, which is particularly useful for printing larger mailing lists. Using either *LabelPro* or *PLP*, you can print graphics to labels, and *LabelPro* also lets you maintain and print from its simple database. Unfortunately, many *LabelPro* features are unavailable to *PLP*. Print speed is good, and you get scalable fonts rather than the bitmapped fonts that come with the CoStar Label Writer II.

CIRCLE 464 ON READER SERVICE CARD

mat), or the *WordPerfect* format.

Both *LabelPro* and *PLP* offer scalable fonts with a choice of typefaces, including Helvetica and Times Roman look-alikes and Code 39 bar code. Text quality is a little ragged at a resolution of 137 dots per inch, but the 12-point bold output looks better than the 10-point font we used for our tests. This larger font does not leave enough room for four address lines plus a Postnet bar code, however.

The software includes lots of small files, and you will need as much as 5.3MB of free hard disk space, in 8K allocation units. If your disk uses smaller allocation units, the program can take up as little as 3MB of disk space.

The company provides free technical support via a toll number open weekdays from 8:00 to 5:00 P.S.T. The Avery printer is covered by a one-year parts-and-labor warranty.

Even without the problems we ran into with PostScript, the Avery package has room for improvement. In particular, the TSR could provide direct access to *LabelPro*'s database and formatting features. The strength of the *LabelPro* and *PLP*

HARDWARE PRINTERS

software is that they provide a single solution for smaller print jobs on the Avery Personal Label Printer, while *LabelPro* can also nicely accommodate larger jobs on your laser or dot matrix printer.

COSTAR CORP.

CoStar LabelWriter II

CoStar Corp. makes the hardware behind both the Avery Personal Label Printer and its own CoStar LabelWriter II, so it is no surprise that the hardware ends of these two products are identical. The CoStar package, however, is priced at \$249.95, about \$30 less than the Avery equivalent, with a street price just under \$200.

Version 1.0 of the *LabelWriter II* TSR software is similar to Avery's *PLP*, but beefed up. *LabelWriter II* has the same ability to capture an address from data going to your standard document printer, but you can set it to capture either the first or second address it sees. It also has the same ability to capture an on-screen address, but as with *PLP*, you have to define the capture area manually by highlighting the text as a block.

Additional *LabelWriter II* features that you won't find in *PLP* include database management in the form of an address book; this feature does not, however, have the same level of sort and selection capabilities as Avery's *LabelPro*. *LabelPro* also has the ability to use more than one font on a label and can save label formats to disk for later use; *LabelWriter II* can't. On the other hand, the CoStar software has somewhat better bar code capabilities, with not only Code 39 but also Interleaved 2/5 bar codes.

On PC Magazine Labs' benchmark tests, the *LabelWriter II*'s print capture feature had the same problem as the Avery TSR. It refused to capture addresses properly from *WordPerfect* when printing to a PostScript document printer, using the word processor's most recent PostScript driver. This is not surprising, since both the Avery and CoStar programs were written by the same company, according to CoStar. CoStar says it will address the problem in the next release.

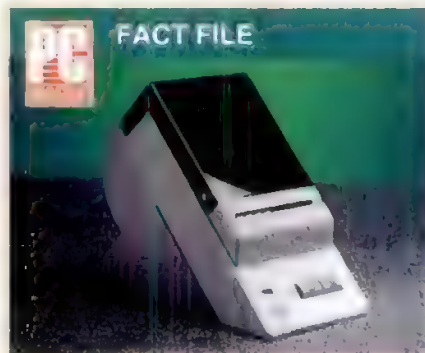
One important difference between the two packages is the way they handle fonts. Instead of Avery's more versatile scalable fonts, CoStar provides a set of bitmapped fonts, including Helvetica and Times

Roman look-alikes. There is also a font generation package for creating additional sizes.

PRINT QUALITY AND SPEED

As with the Avery, the *LabelWriter II*'s print quality is limited by its resolution of 137 dots per inch. But *LabelWriter II* puts less space between lines, so you can fit four 12-point address lines on the same label as a Postnet bar code. The larger font size yields better-looking labels than the 10-point text you are forced to use when printing the Postnet bar code with the Avery product.

Print speed is slightly faster than with the Avery software, even with the larger 12-point font. Printing an individual label with a four-line address takes 3.6 seconds with or without the Postnet bar code. The package also managed 85 labels in 5 minutes on our test, with or without the Postnet code.



CoStar LabelWriter II

CoStar Corp., 22 Bridge St., Greenwich, CT 06830-5238, 800-426-7827, 203-661-9700

List Price: With printer, software, serial cable, one roll of labels, \$249.95

Requires: 35K RAM, 900K hard disk space, DOS 3.0 or later, serial port

In Short: The CoStar LabelWriter II is the fastest of the reviewed low-end label printers, slightly passing the Avery Personal Label Printer that is almost its twin. It lacks the ability to mix fonts, add graphics, or read data from common database-format files, but the features it has are all pleasingly integrated in a single TSR. Additionally, and unlike the Avery printer, this printer can print a 12-point four-line address and Postnet bar code on a single label.

CIRCLE 466 ON READER SERVICE CARD

The LabelWriter II's print speed is slightly faster than Avery's, even with the larger 12-point font. Printing an individual label takes 3.6 seconds.

You can only print mailing lists from the program's own address book, but you can import files in a comma-separated variable format.

Like the Avery, the *LabelWriter II* measures a compact 6.3 by 3.9 by 7 inches (HWD) and has a fixed thermal printhead. It uses rolls of 1.1- by 3.5-inch labels. The printhead spans only half the potential width of the printer.

By the time you read this, CoStar will also be selling a \$399 wide-carriage version, the *LabelWriter II Plus*, that can handle labels up to twice the print width; CoStar will also be selling labels in a variety of sizes. Current label offerings include packs of 20 rolls, with up to 350 labels per roll. You can buy 20 rolls of 130 1.1- by 3.5-inch

white labels for \$80. As you would expect, this printer can also use the Avery's labels.

Free technical support is available via a toll number weekdays from 9:00 to 6:00 E.S.T., and the product is covered by a one-year parts-and-labor warranty.

All told, the CoStar *LabelWriter II* is the no-frills choice among lower-end label printers. If you want the convenience of a label printer, and you don't need to print large numbers of labels at once or mix fonts and add graphics to your labels, then this printer may well be the one to get.

ELTRON INTERNATIONAL INC.

Eltron LP-2042

The Eltron LP-2042, from Eltron International, is the only printer in this overview that was designed for high volume. It is also the only package that gives short shrift to envelope-style address labels while offering such features as automatic serial-number generation, ten different bar codes, and ten different label sizes—in both standard thermal and infrared-scanable stock. This is, in short, an industrial-strength bar-code printer that also has enough mailing label-printing capabilities to qualify for this review.

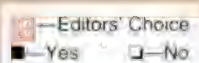
As you might expect, the Eltron is also

HARDWARE PRINTERS



SUMMARY OF FEATURES

Products listed in alphabetical order by category



LABEL PRINTERS

Avery Personal Label Printer

CoStar LabelWriter II

Eltron LP-2042

Seiko Smart Label Printer Plus

List price (tested configuration)	\$279.95	\$249.95	\$1,392.95	\$199.95
Dimensions (HWD, in inches)	6.3 x 3.9 x 7.8	6.3 x 3.9 x 7.8	5.9 x 7.6 x 9.1	6.2 x 3.6 x 6.3
Weight (pounds)	1.3	1.3	3.4	1.1

PHYSICAL CHARACTERISTICS

Engine type	CoStar	CoStar	Eltron	Seiko
Print technology	Thermal	Thermal	Thermal	Thermal
Printhead design	Full-line	Full-line	Full-line	Serial
Print orientation	Horizontal	Horizontal	Horizontal or vertical	Horizontal
Paper paths supported	Back-feed	Back-feed	Back-feed, straight-through	Back-feed
Interfaces supported	Serial	Serial	Parallel, serial	Serial
Maximum speed claimed	1 inch per second	1 inch per second	2 inches per second	0.4 inch per second
Maximum resolution (dpi)	137 x 137	137 x 137	203 x 203	150 x 200
Fonts supported (excluding bar code fonts):				
Courier	☐	☐	☐	☐
Helvetica	☒	☒	☒	☐
Times Roman	☒	☒	☒	☐
Total fonts	20	9	10	45

LABEL PRINTER FEATURES

Maximum label capacity	350 (1.1 x 3.5 inches)	350 (1.1 x 3.5 inches)	1,138 (1.3 x 2.5 inches)	130 (1.1 x 3.5 inches)
Automatically formats and positions labels	☒	☒	☐	☒
Maximum characters per line on a label	65	40	44	50
Maximum number of lines per label	7	5	7	8

ENVELOPE PRINTER FEATURES

Maximum envelope capacity	N/A	N/A	N/A	N/A
Maximum postcard capacity	N/A	N/A	N/A	N/A
Rated envelope or postcard sizes:				
Width (inches)	N/A	N/A	N/A	N/A
Length (inches)	N/A	N/A	N/A	N/A

SOFTWARE FEATURES

Software	LabelPro 1.51, PLP 1.01	LabelWriter II 1.0	Create-A-Label 3.0	Smart Label Printer Plus 2.02
TSR for reading addresses off-screen from other programs	☒	☒	☐	☒
Reads addresses from data files	☒	☒	☒	☒
Allows manual entry of addresses	☒	☒	☒	☒
Maintains its own database of names and addresses	☒	☒	☐	☒
Supports Postnet bar codes	☒	☒	☐	☒
Supports bar codes other than Postnet	☒	☒	☒	☒
Mixes fonts	☒	☐	☒	☒
Includes scalable typefaces	☒	☐	☐	☐
Supports graphics	☒	☐	☒	☐
WYSIWYG display	☐	☐	☒	☒
Creates and saves label and envelope formats	☒	☐	☒	☒
Simultaneous access to document printer and label or envelope printer	☒	☒	☐	☒
Software available for other operating systems	☒ (Macintosh System Software 6.x or later)	☐	☐	☒ (Macintosh System Software 6.0.3 or later)

N/A—Not applicable. The product does not have this feature.

HARDWARE PRINTERS

ENVELOPE PRINTERS

CoStar
AddressWriter

PC

Tidemark
Address Express

\$595.00
9 x 8 x 14
9

\$1,195.00
7.5 x 16 x 16
17

CoStar
Dot matrix
Serial
Horizontal

Tidemark
Ink jet
Serial
Horizontal or
vertical
C-path

Back-feed,
straight-through
Serial

Serial

5 envelopes per
minute
144 x 144

4 envelopes per
minute
192 x 192

■
■
■
8

■
■
■
81

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

100

100

200

100

5-10.5

5-10.4

3.5-4.3

3-6.3

AddressWriter
1.01

Address Express
1.1

■
■
■
■

■
■
■
□

■

■

□

□

□

□

□

■

□

■

□

■

■

□

■ (Macintosh System
Software 6.x or later)

■ (Macintosh System
Software 6.0.5 or later)

the most expensive printer in this roundup. A base-priced system is \$949 for the parallel version plus one roll of labels, \$295 for the software, and \$12.95 for the cable. As tested, the unit also included a serial port and stripper to strip labels automatically from the carrier. With all this, the total price was \$1,392.95. A narrow-carriage version—which will print on a maximum 2.3-inch-wide label rather than a 4.3-inch label—costs \$1,146.95 if similarly equipped.

The Eltron is the only package in this group that lacks any TSR or background software features. But you can still print addresses with the label printer while printing letters or the equivalent at your document printer, since the Eltron can accept text from virtually any program. This is not quite a self-contained feature, however, since you have to sweat a little to make it work: First, you will need an appropriate driver for your word processor—typically called TTY or “generic” in most programs—and you need to set the page size to match the label size. You should do this by writing a macro for your word processor; most will allow it. The macro should handle all these details for you, mark the address in the document, print, then change the settings back to what they should be for your document printer. If you need this functionality but the process sounds intimidating, then the Eltron is probably not the right printer for you.

CREATE-A-LABEL SOFTWARE

As you might suppose, Eltron's *Create-A-Label* 3.0 is designed for heavy-volume printing. The WYSIWYG label editor will let you define label formats, with complete control over label size (up to 4 by 6 inches), fixed text (using Helvetica or Roman fonts in a choice of six sizes), variable fields for reading from a *dBASE*-format data file, and bar codes.

The program has two drawbacks for creating mailing labels: First, it is not bright enough to adjust the starting position of one field in a line based on the length of the previous field. If you don't leave lots of room for the city field, for example, *Create-A-Label* will print the city over the state. With short city names, you are left with large gaps of white space before the state. Its second deficiency is an inability to print Postnet bar codes.

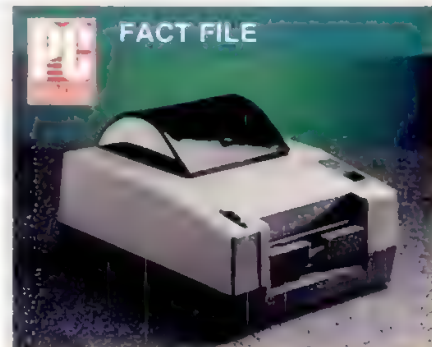
It supports lots of other bar codes,

however: CodaBar, Code 39, Code 128C, EAN 8, EAN 13, Interleaved 2/5, UPC-A, and UPC-B. The Eltron includes Code 128B in firmware, and Eltron says it will have added Postnet support by the time you read this. As already mentioned, the software will generate serial numbers starting with any number you specify. In addition, you can add graphics in .BMP, .MSP, or .PCX formats as well as add boxes and lines.

With a resolution of 203 by 203 dots per inch, text characters are reasonably solid, even at the printer's top speed of 2 inches per second. On PC Magazine Labs' benchmark tests, the printer managed a speedy 1.4 seconds for printing one four-line address on a 2.3-by 1.3-inch label and an extraordinary 309 labels in 5 minutes.

You can get toll-free technical support for the printer weekdays from 8:00 to 4:30 P.S.T. Except for the printhead, which has only a three-month warranty, the Eltron unit is covered by a one-year parts-and-labor warranty.

Clearly, this is not a printer for those who just want to print an address label each time they print a letter. But if you need high speed, bar codes, or other heavy-



Eltron LP-2042

Eltron International Inc., 21620 Lassen St.,
Chatsworth, CA 91311; 800-344-4003, 818-
885-6484

List Price: With printer with parallel and serial
ports, software, one roll of labels, parallel
cable, stripper, \$1,392.95.

Requires: 640K RAM; 1MB hard disk space;
DOS 3.0 or later; Hercules, EGA, or VGA
video adapter; parallel or serial port.

In Short: More a bar code printer with the
ability to handle mailing lists, the industrial-
strength Eltron LP-2402 can print ten different
bar codes, automatically generate serial
numbers, and print from *dBASE*-format files at
an impressive rate of more than 300 labels in
5 minutes. But it lacks a TSR allowing it to
print a label while your document printer is
simultaneously active. Although Eltron plans to
implement Postnet bar code capabilities by the
time you read this, don't choose this version if
you only need to print an address label each
time you print a letter.

CIRCLE 466 ON READER SERVICE CARD



PERFORMANCE TESTS

Not surprisingly, printing an address on a label is quicker than on an envelope. More interesting are the differences in speed and throughput within each of these two categories. Label printers in particular run the gamut from industrial-strength speeds to those suited for printing one label at a time.

WHAT THE NUMBERS MEAN

As a rule, multiple labels or envelopes each print faster than a single label or envelope because of paper-handling economies: While ejecting a completed label or envelope, the printer simultaneously feeds a new label or envelope into the mechanism. For example, although it might take 3.5 seconds to print a single label, printing two labels may take as little as 5 seconds, or 2.5 seconds per label.

LABEL PRINTERS

The Eltron LP-2042 was the fastest label printer, taking only 1.4 seconds to produce one label and outputting 309 labels in 5 minutes. But the Eltron does not yet support Postnet bar codes—a drawback if your main goal is to put address labels on envelopes.

The Avery Personal Label Printer and CoStar LabelWriter II both use the same thermal printhead mechanism, but they employ different software. The common mechanism explains the similarity in test scores: The LabelWriter II came in just slightly faster than the Avery on three of PC Magazine Labs' four benchmark tests. The differences you may note between the two products' scores—especially in printing labels with Postnet bar codes—primarily reflect the software differences.

Trailing the pack among the label printers was the Seiko Smart Label Printer Plus. Even when printing labels without Postnet bar codes, the Seiko required almost 10 seconds to print one label and managed only 32 labels in 5 minutes.

N/A*—Not applicable: This product does not print Postnet bar codes.

ENVELOPE PRINTERS

In normal mode, the 8-pin dot matrix CoStar AddressWriter was the faster of the two envelope printers we reviewed. With the AddressWriter, you can't print the Postnet bar code without printing the FIM bar codes as well. Nevertheless, in normal mode its Single Address with Postnet and FIM test time beats the time the Tidemark Address Express achieved on the Single Address with Postnet test.

The AddressWriter's high-quality mode is better than the normal mode, which is already quite good. While the high-quality mode's single-strike unidirectional print slows the printer, the speed decrease is small enough that you won't be discouraged from choosing the highest-quality output when you need it for small or medium-size print jobs. The decrease in speed, however, may lead you to choose the normal mode for larger print jobs.

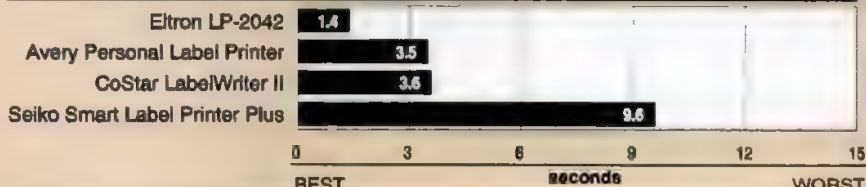
The Tidemark Address Express was the only ink jet printer. It nearly matched the AddressWriter's high-quality-mode score on the Multiple Addresses Without Postnet test, and it surpassed the AddressWriter's high-quality scores on the tests with both Postnet and FIM codes.

HOW WE TESTED

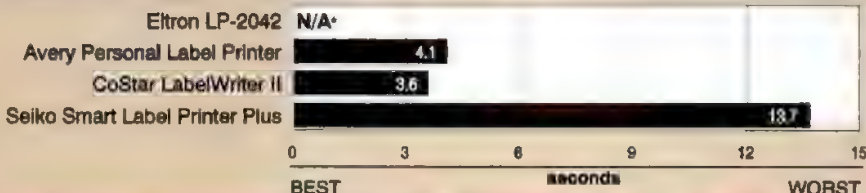
For each label or envelope printer and its accompanying software, we first experimented with available typefaces, font sizes, and print modes (such as high-quality versus high-speed). We then chose a font, a typeface, and (when applicable) a print mode to create the optimal balance between speed and quality; in each case, we assume this is the combination of settings that the majority of users are likely to use most often.

We tested the Eltron LP-2042 at its highest speed (2 inches per second) and kept its Helvetica font at setting number 2

Single Address Without Postnet



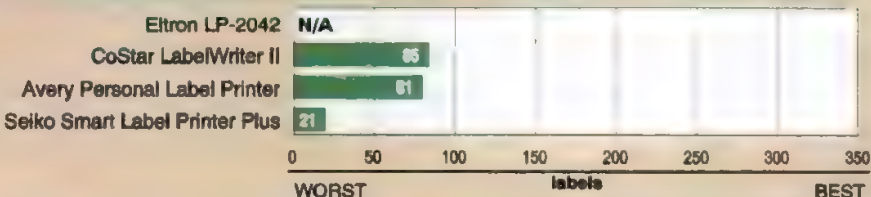
Single Address with Postnet



Multiple Addresses Without Postnet



Multiple Addresses with Postnet



(Eltron does not classify its fonts according to standard point sizes). For the Avery Personal Label Printer, we used an Ariel 10-point font (anything larger would not accommodate the full four-line address), and we selected high-quality mode. We tested the CoStar LabelWriter II with a 12-point sans serif Dixon font in high-quality mode. For the Seiko Smart Label Printer Plus, we used a 10-point Chicago nonenhanced font and ran our tests in high-speed normal-quality mode.

The Tidemark Address Express used a

12-point sans serif font in its only available mode. The CoStar AddressWriter also used a 12-point sans serif font. We report AddressWriter results for both normal and high-quality modes because neither mode proved the obvious choice; in each mode, print quality and speed were evenly balanced for small- and medium-size jobs.

Our test-bed was a Northgate 486/25; most of the printers were hooked up to its serial port. The exception was the Eltron, which uses a parallel interface. All the label printers except the Eltron used 1.1- by 3.5-

inch labels; the wide-carriage Eltron, which can handle labels up to 4.3 inches wide, used 2.3- by 1.3-inch labels. For the envelope printers, we used standard business-size envelopes.

We performed two types of tests. First, we timed how long it took each printer to print a single label or envelope (depending on the kind of printer). To determine how fast these products can print a mailing list, we set the printers in operation for an uninterrupted period of 5 minutes, and we report how many labels or envelopes were completed during this time.

For both types of tests, we used a standard, four-line, left-aligned address. We tested the products that can print a Postnet bar code both with and without the code, and we report both scores. For the envelope printers, we also report scores for printing addresses with both Postnet and FIM bar codes together.

In the case of the Avery, we used the company's *PLP* TSR for the single-address tests; we used Avery's *LabelPro* foreground software for the multiple-address tests. This reflects the fact that most users would typically use the TSR for printing out a single address label while working in another document. But you can't use *PLP* to print more than one label at a time; it is unsuitable for printing mailing lists.

The **Single Address Without Postnet** test reports the time required to print a four-line business address on one label or envelope.

The **Single Address with Postnet** test reports the time required to print a four-line business address and a Postnet bar code on one label or envelope.

The **Single Address with Postnet and FIM** test reports the time required to print a four-line business address with Postnet and FIM bar codes on one label or envelope.

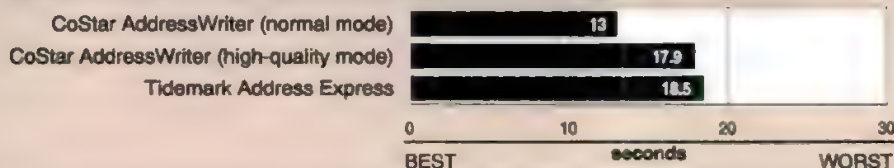
The **Multiple Addresses Without Postnet** test reports the number of four-line business addresses each printer can print on labels or envelopes in a 5-minute period.

The **Multiple Addresses with Postnet** test reports the number of four-line business addresses with Postnet bar codes that each printer can print on labels or envelopes in a 5-minute period.

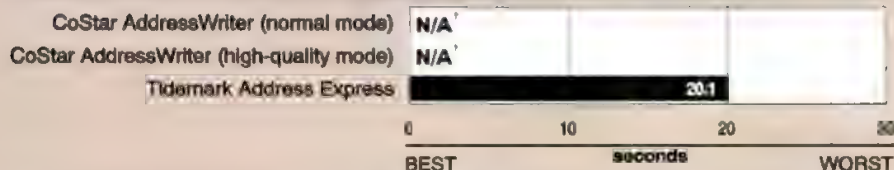
The **Multiple Addresses with Postnet and FIM** test reports the number of four-line business addresses with Postnet and FIM bar codes that each printer can print on labels or envelopes in a 5-minute period.

N/A*—Not applicable: This product can print Postnet bar codes only in conjunction with FIM bar codes

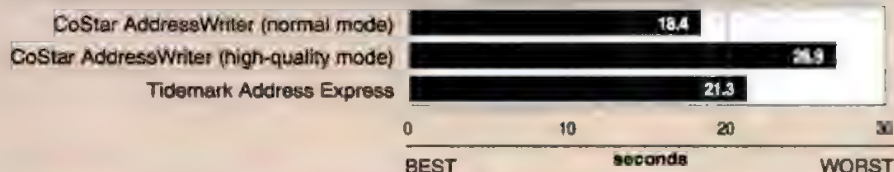
Single Address Without Postnet



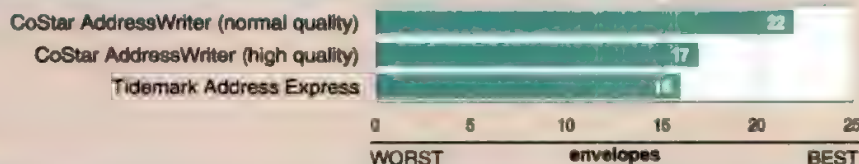
Single Address with Postnet



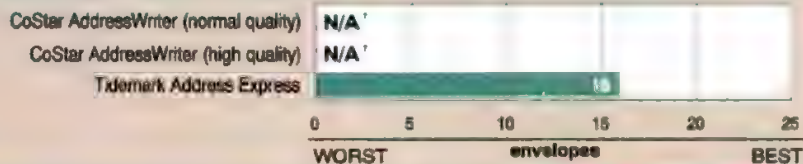
Single Address with Postnet and FIM



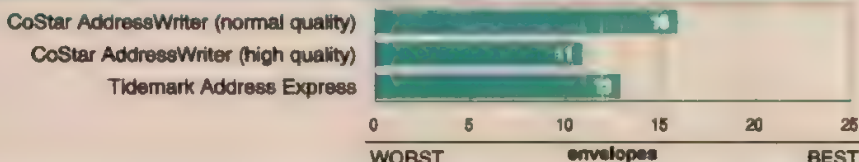
Multiple Addresses Without Postnet



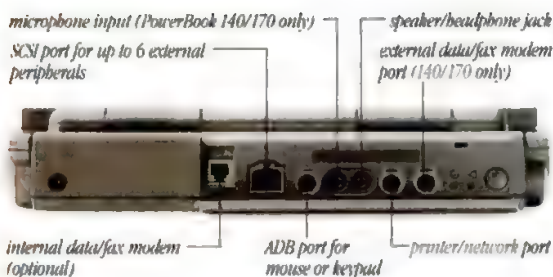
Multiple Addresses with Postnet



Multiple Addresses with Postnet and FIM







*The PowerBook 100 outperforms comparably configured 286 PCs running Windows 3.0.***



*The PowerBook 140 outperforms comparably configured 16MHz and 20MHz 386sx PCs running Windows 3.0.***



The AppleTalk® Remote Access software (included) gives you access to your Macintosh personal computer via phone line – so you can use all your files or e-mail, or an entire AppleTalk network, from wherever you are.



A trackball and palm rests make the PowerBook extraordinarily comfortable for both left- and right-handed people to use.



PowerBook offers a new level of compatibility – its built-in Apple® SuperDrive™ disk drive reads from and writes to Macintosh and MS-DOS formatted disks. Add SoftPC and you can run MS-DOS programs, too. (You can even run MS-DOS and Macintosh programs at the same time.)

PowerBook	Weight	Memory	Hard Disk	SuperDrive	Processor	Internal Modem
100	5.1 lb.	2/4MB	20/40MB	Optional ext.	16 MHz 68000	Optional
140	6.8 lb.	2/4MB	40/80MB	Internal	16 MHz 68030	Optional
170	6.8 lb.	4MB	40/80MB	Internal	25 MHz 68030/ 68882 coprocessor	Optional

All PowerBook models expandable to 8MB RAM

For the name of your nearest authorized Apple reseller call 800-446-3000 ext. 100. To run MS-DOS all you need is a program like SoftPC and an Apple SuperDrive. ©1991 independent research study conducted by Ingenium Laboratories that tested a variety of personal computers running applications available for both the 3.1 registered trademarks, and PowerBook and SuperDrive are trademarks of Apple Computer, Inc. MS-DOS is a registered trademark and Windows is a trademark of Microsoft Corporation.

ANNOUNCING

COMPUTER SELECT™

The Most Complete Database Of Computer Product Information Available



Get instant access to more than...

- ✓ 70,000 articles and abstracts from over 140 leading publications
- ✓ 70,000 hardware, software and communications product specs
- ✓ 12,000 company profiles, including addresses and phone numbers
- ✓ 9,000 definitions of computer and telecommunications terms.

Tens of thousands of reviews, analyses, buyer's guides and manufacturer listings—on one disc! COMPUTER SELECT makes it easy to browse titles, read entire articles, check abstracts and find the names and addresses of manufacturers...fast. You can copy data to a file or print out all or part of your search results. Call for a free demonstration disk!

Now there's COMPUTER SELECT. It's the new, enhanced version of the Computer Library database, developed by the publishers of PC Magazine and PC Week. With COMPUTER SELECT you can identify, evaluate and select the computer products you need in a fraction of the time.

Find All The Hardware And Software Information You Need...From Product Evaluations And Specifications Right Down To The Manufacturer's Phone Number

COMPUTER SELECT gives you immediate access to information from the best magazines, newsletters, technical and business publications reporting on the

COMPUTER SELECT HELPS ANSWER KEY QUESTIONS FASTER, SMARTER, EASIER

1. In a given product category, such as battery-powered 20 mhz 80386-sx portable computers, what are the available products...their specifications...their prices?
2. What are all the products in a given category whose list price is less than my budget?
3. Which products earned the best reviews in a given category?
4. What does the installed user base say about my options?
5. Will it run on my LAN?
6. What tips and techniques can I learn to get more from the products I use?
7. If I buy a particular product now, is the manufacturer likely to be in business if I need help later?
8. What are the benefits of upgrading to the new version of a software product I use?
9. How do I reach a manufacturer? Is there an 800 number?
10. What are the marketing strategies of a given computer industry company...who is the key marketing contact?

computer industry. Researching products can be done quickly and efficiently right at your desk.

Then, when you find the product that's best for your needs, you can obtain its specifications and locate the manufacturer in a snap. Because now COMPUTER SELECT incorporates all the reference information from *Data Sources®* the leading computer industry directory. That means you'll find specs for over 70,000 hardware, software and data communications products—plus profiles of the 12,000 companies that make the products you want.

YOU'LL SEE RESULTS IN LESS THAN ONE HOUR

New users are doing productive work in less than one hour. No installation is needed. Just pop in the CD-ROM disc and a few simple steps locate, retrieve and print the information you want. And a new, updated disc is sent to you each month so you'll always have current product information.



COMPUTER SELECT is "Highly Recommended" for...

• Micro Managers, PC Coordinators, MIS Directors, LAN Administrators • Purchasing Agents • Information Center Managers • User-Support Groups • Training Organizations • Programmers, Developers • Product Marketers and Planners • Resellers, OEMs, VARS, System Integrators • Journalists, Consultants, Industry Analysts • Salespeople, Public Relations Managers • Law Firms.

COMPUTER SELECT helps you S-T-R-E-T-C-H your resources!

In today's economic climate many companies have put a lid on support expenditures, but not on workload or expectations. That's why COMPUTER SELECT is more essential than ever. It's designed to stretch your support resources and promote cost-effective purchasing.

"COMPUTER SELECT is the best single source of industry information available, and it's at my fingertips whenever I need it."

*Jonathan D. Lazarus/Microsoft Corporation
General Manager, Systems Software Marketing*

"The real value of COMPUTER SELECT is in the hidden cost of missed information that could be mission-critical. With this product's ability to conduct broad-based queries, you can be confident that you have checked all the relevant sources and you're thoroughly up-to-date."

*Bob Hayes/Nordstrom, Inc.
Technology Architecture Manager*

"I was looking for a tape backup device that could hold 2.2 gigabytes. A search like that used to take days. With COMPUTER SELECT it took 10 minutes to get all the information I needed."

*Joseph Curtis/Con Edison
General Manager for Systems Engineering*

212-503-4400

COMPUTER LIBRARY

Computer Library, Computer Select and Data Sources® are trademarks of Ziff Communications Company © 1991 Ziff Communications Company

duty features, the Eltron LP-2402 is certainly worth your consideration.

SEIKO INSTRUMENTS USA INC.

Seiko Smart Label Printer Plus

The Seiko Smart Label Printer Plus, from Seiko Instruments USA, has the distinction of offering the most mature software of any package in this roundup. Unfortunately, it is also the slowest printer of the group. The result is a \$199.95 package (roughly a \$150 street price) that shines at printing one label at a time but is distressingly slow when printing multiple labels.

The Seiko software includes a WYSIWYG formatting feature that makes label design a snap. You can load the software as either TSR or foreground. As a TSR, it needs 153K RAM, but you can set it to use as little as 8K of RAM and have it swap to disk or EMS (expanded memory specification) when necessary.

MATURE TSR SOFTWARE

When you call up Version 2.02 of the *Smart Label Printer Plus* TSR, the program searches the screen for an address. It then stops to let you adjust the capture area before accepting the address, or you can bypass the capture entirely. The next step is the main menu, with a WYSIWYG on-screen representation of the label. You can then change the text or format, print the label, save the text for future use, or use any of the program's other features.

Text stored by the program is not what you would normally think of as a database. You must manually tag individual items and print all tagged items with a single command. You can also search through the choices to find an item, then print that item only or paste it into the application you were in when you called up the TSR. If you need to print multiple labels, you can use any file created in ASCII format. The program will automatically apply the font, positioning, and other current format settings on a line-by-line basis, so you don't even have to think in terms of fields. Alternatively, you can print from any program that will send ASCII text without adding printer control codes.

The Seiko software lets you save as many formats as you like. Font choices

HARDWARE PRINTERS

include 34 typefaces in various sizes, for a total of 45 fonts. Though it does not support Courier, Helvetica, or Times Roman fonts, you can choose from fonts such as Chicago, Standard 12E, and Boxie 12M. Most of these print parallel to the 3.5-inch side of the 3.5- by 1.1-inch labels. A few print in vertical format—meaning one character above another like Chinese writing. You will also find four bar codes as font choices: Code 39, EAN 13, Interleaved 2/5, and UPC A. You can define different fonts for each line and add a Postnet bar code. (The Postnet code is not treated as a font.)

GOOD PRINT QUALITY; SLOW SPEED

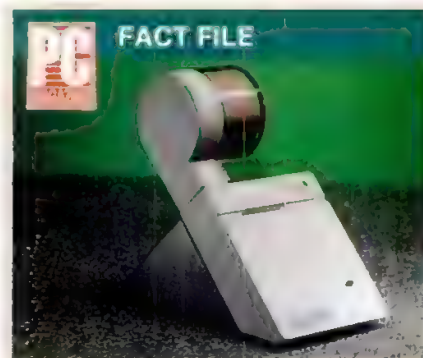
The Seiko has a maximum resolution of 150 by 200 dots per inch, which yields a reasonably good print quality. Physically, the printer measures 6.2 by 3.6 by 6.3 inches. It uses direct thermal technology and 1.1- by 3.5-inch labels.

The Seiko can use labels from Avery or CoStar, though you cannot use Seiko labels in either of those printers because of the position of the alignment holes. Seiko sells a two-roll package of white labels for \$7.99 and will sell a two-roll package of clear labels with 130 labels per roll for \$14.99 (when they ship).

Unfortunately, the Seiko's shuttle print-head makes for slow printing. On PC Magazine Labs' benchmark tests, a single label printed in high-speed mode with a 10-point font took 9.6 seconds without a Postnet bar code and 13.7 seconds with Postnet. This is acceptable for printing a single label while you're printing the letter, but for multiple labels this translates to only 21 labels with a Postnet bar code or 32 labels without Postnet in 5 minutes. And if you use one of the program's high-resolution fonts in quality print mode with Postnet, the print time can stretch to over 1 minute for a four-line label.

Its one-year parts-and-labor warranty and weekday technical support from 7:30 to 5:00 P.S.T. via a toll number help the Seiko measure up to its competition in terms of service and support.

The Seiko is the second in the line of label printers from this company, the first being the Seiko Smart Label Printer we previously reviewed ("Name and Address for Less: Envelope Printers Cut Your Costs," *PC Magazine*, January 29, 1991). Like the current offering, the original model also suffered from slow speed.



Seiko Smart Label Printer Plus

Seiko Instruments USA Inc., PC Products Division, 1130 Ringwood Ct., San Jose, CA 95131, 800-888-0817, 408-922-5900.

List Price: With printer, software for either PC or Mac, serial cable, one roll of labels, \$199.95

Requirements: 512K RAM, 176K LIM EMS memory recommended, 0.8MB hard disk space, EGA or VGA recommended, DOS 2.1 or later, serial port.

In Short: The Seiko Smart Label Printer Plus is accompanied by one of this group's most mature and effective software offerings. This package can automatically capture on-screen addresses, perform WYSIWYG label formatting, and print with almost any application. Its print speed is acceptable when you are printing only one label at a time but is too slow for printing large numbers of labels at once.

CIRCLE 467 ON READER SERVICE CARD

Seiko planned to introduce a new label printer in April. The new product will be priced at \$249.95 and will include software for both DOS and Microsoft Windows 3.0. The Windows version will incorporate all the DOS software's features, as well as provide multiple lists in its database and the ability to cut and paste graphics and text from other Windows applications.

Clearly, the Seiko Smart Label Printer Plus is the wrong package to get if you need to print multiple labels. But if your needs are strictly for one label at a time, you may decide the slow print speed is balanced by the excellent software.

ENVELOPE PRINTERS

COSTAR CORP.

CoStar AddressWriter

Probably the best description of the \$595 CoStar AddressWriter is that this printer is what the CoStar LabelWriter II would be if the LabelWriter II could print on envelopes. The AddressWriter, of course,

is a notably different piece of hardware, but the TSR software is so similar that you have to look carefully to see the differences.

The AddressWriter has a footprint of just 9.5 inches deep by 8 inches wide. The envelope-feed attachment projects in back to yield an overall size of 9 by 8 by 14 inches. That makes it substantially larger than a label printer but still small enough to fit conveniently on your desk. The envelopes feed sideways, with the text rotated, so the 8-inch width is enough to handle envelopes or postcards up to 4.3 inches high by 10.5 inches wide.

Most important, the envelope-feed mechanism is reliable. We didn't experience a single jam during our tests. CoStar Corp. plans to release a label-feed option for continuous-form labels. The option will have a list price of \$75 and should be available by late spring of 1992.

Inside the printer is an 8-pin dot matrix printhead. The unit uses three passes per line, for a maximum resolution of 144 by 144 dots per inch. The dot matrix technology is noisy, but the sound deadening is good enough so the noise is not bothersome for small print jobs. If you plan to print large mailing lists, though, noise may become an issue.

CHOOSING PRINT QUALITY

AddressWriter, Version 1.01, lets you choose between printing with high-quality mode (unidirectionally) or normal quality (bidirectionally). On PC Magazine Labs' benchmark tests, the high-quality setting yielded somewhat better output, producing what passes for letter-quality text in the dot matrix world. The normal setting yielded correspondence-quality output.

As you would expect, there is a speed difference between the two quality settings, but it is less than you might think. Printing a four-line address with a 12-point font at the normal setting took 13 seconds for the address by itself and 18.4 seconds with a Postnet bar code and a FIM (Facing Identification Marks) code. At the high-quality setting, the times were 17.9 seconds and 26.9 seconds, respectively. Without the Postnet code, the package printed 22 envelopes in 5 minutes in normal mode, compared with 17 envelopes in high-quality mode. With the Postnet code, it printed 16 envelopes in normal mode, compared with 11 in high-quality. If you print a mailing list from the software's address book, these time differ-

ences will add up, but probably not enough to discourage you from choosing high-quality—when you need it—for small to medium runs. For large print jobs, the slowdown will become more noticeable, and you may want to stick with normal mode.

AddressWriter has most of the same functions as CoStar's *LabelWriter II*. It even has the same problem with capturing an address sent to the document printer using *WordPerfect's* PostScript drivers. CoStar is working on a fix for this problem, which should be available in the next release. AddressWriter, however, lacks a font generation feature, and its Helvetica and Times Roman equivalents are monospaced variations.

Other differences from *LabelWriter II* are dictated by the way you want your envelopes to look. Currently, you have the option of printing the return address, but the next version of the program (which was not ready for our tests) will also let you add a message. Missing from the package is support for any bar codes other than Postnet.

All told, the AddressWriter is one of the better choices of this roundup. It won't

add graphics, nor will it print bar codes other than Postnet or even print proportionally spaced addresses. But it will reliably print near-letter-quality envelopes. The system also includes a one-year parts-and-labor warranty and free (though not toll-free) technical support weekdays from 9:00 to 6:00 E.S.T. At an expected street price of just under \$500, you might say that the CoStar AddressWriter will do a good job of addressing your needs.

TIDEMARK CORP.

Tidemark Address Express

The Tidemark Address Express, from Tidemark Corp., is one of this roundup's only two envelope printers, the only ink jet printer, and the only package with special network support. Alas, the \$1,195 list price, which translates to a street price of about \$850, makes it one of the more expensive printers as well.

The physical design and size of the Tidemark is similar to that of a standard document printer. The footprint is 14.3 inches wide by 16 inches deep, with the input bin extending out to the side, making the unit 7.5 by 16 by 16 inches. Stacks of envelopes, postcards, or single labels go in the input bin on the right side, feed through the printer in a C-shape path, and drop into the output bin on top, as with most laser printers, except with the printed side face-up. The input bin has a maximum capacity of 100 envelopes, postcards, or single labels. The minimum size it can handle is 3 by 5 inches; the maximum is 6.3 by 10.4 inches.

The Tidemark's ink jet technology and resolution of 192 by 192 dots per inch yield fully formed characters that approach letter quality, but its output is certainly not in the same league as that of a laser printer or even the HP DeskJet. The real advantage to the technology is that it is quiet. You can hear the motors moving the envelope through the printer and even the printhead moving back and forth, but the printing itself is silent.

LAYOUT AND A TSR

Address Express, Version 1.1, consists of separate modules. The foreground Layout module provides a Windows-like environment—complete with pull-down



CoStar AddressWriter

CoStar Corp., 22 Bridge St., Greenwich, CT 06830-5238; 800-426-7827, 203-661-9700.

List Price: With printer, software for both DOS and Mac, serial cables for both PC and Mac, envelope catcher, \$595.

Requires: 45K RAM, 600K hard disk space, DOS 3.0 or later, serial port.

In Short: The CoStar AddressWriter offers a reliable envelope feed mechanism, dot matrix letter-quality output, and a TSR capable of capturing addresses from other applications and printing return addresses. It cannot print graphics or bar codes other than Postnet, nor is there a font generation feature, but the printer's speed, compact size, and quality output provide all the features you will need.

CIRCLE 466 ON READER SERVICE CARD



If there were a printer that could give you this kind of color, would you still make your presentations in black and white?

Do your business presentations go in one eye and out the other? The Colormate™ PS can easily and affordably give them the impact they deserve. Enhancing your work with truly amazing color, from brilliant primaries to soft pastels. All Pantone® approved.

The Colormate PS integrates readily with any network, PC or Mac. And it's compatible with most popular business presentation and graphics software. Of course, Adobe® PostScript® is standard. The Colormate PS comes in two

models—the economical Model 40 with 4MB of memory and 17 resident fonts, and the fully featured Model 80 with 8MB of memory and 35 resident fonts. Both feature reliable 300 DPI thermal transfer technology.

For your free Color Presentations Guide and more information, call 1-800-NEC-INFO. Or call NEC FastFacts, 1-800-366-0476, document #26567, for info via fax.

After all, the world isn't black and white, why should your presentations be?


© 1991 NEC Technologies, Inc. Colormate is a trademark of NEC Corporation. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. Macintosh is a registered trademark of Apple Computer, Inc. Pantone is a registered trademark of Pantone, Inc.

CC Computers and Communications

NEC

CIRCLE 156 ON READER SERVICE CARD

TM Estate of Marilyn Monroe. Represented by The Ringer Richman Agency Inc. Beverly Hills, CA



You can't duplicate the app

The real beauty of PC Magazine is that it's the
Department heads, MIS managers, LAN specialists
Meaning you don't have to give other



deal of PC Magazine, either.

most efficient way to attract all your target markets.
and resellers. It delivers over 870,000 brand specifiers.
publications as much as a second look.



Nothing comes close.

THE BIG ★★★



WORDS



GRAPHICS



NUMBERS

For the fast-paced business world of the 90's, you need to use the best possible tools in every aspect of communication. A combination of **words** to tell the story, **graphics** to create impact, **numbers** to fill in the details. Windows gives you the freedom to work easily with the **best** in each category and use an **easy-to-use** interface. CorelDRAW, with over 40 international 1st place awards, is the logical choice to add graphics to your words and numbers. It's the most versatile, powerful and the easiest to use. And today, the impact of graphics is a **must** to get your message across.

CorelDRAW — the graphics choice!

MOST VERSATILE

Dress up any document. Watch your project go from the ordinary to the spectacular using CorelDRAW's special effects.

EASIEST TO USE

Just point and click. CorelDRAW does the rest. It's fast and it's fun! No wonder it's the world's #1 seller.

BEST TYPE CONTROL

Over 150 fully scalable outline fonts can be altered in any way. Kern visually, extrude, envelope, apply perspective, or curve text. Nobody else comes close!

BEST CLIPART

Choose from over 4,000 images and symbols. Use it 'as is' or as elements in your own designs. "Publish" readers voted it "Best Clipart"!

Available for Windows, OS/2, Unix and CD-ROM!



1-800-836-DRAW
FAX: (613) 726-9176
CDN TEL: (613) 726-8200

CIRCLE 177 ON READER SERVICE CARD

menus, pop-up dialog boxes, and mouse support—for defining formats. Layout lets you define a custom size or choose from ten predefined sizes (though the predefined sizes will not help much if you don't know what a number 6.8 envelope is, for example). It also lets you add a return address, message line, Postnet bar code, additional text, or graphics (in .BMP, .PCX, or TIFF formats) and adjust the position of these objects with the keyboard or a mouse drag.

Other menu choices let you assign fonts to any text selection. The program offers eight typefaces in normal, bold, italic, and light variations as well as several font sizes, for a total of 81 fonts. There is no support for bar codes other than Postnet.

Once you save a format, you can use it with the package's TSR utility. When you call on the utility, it looks for an address on-screen and highlights it. You can then adjust the highlighted area, edit the text (including the return address and message if there is one in the current layout), choose a different layout, or give the command to print.

The TSR has no database management feature, but you can use it to print from any application program that has a generic printer driver and uses form feeds to indicate new pages. The TSR will capture the output from the application and redirect it to the Tidemark printer.

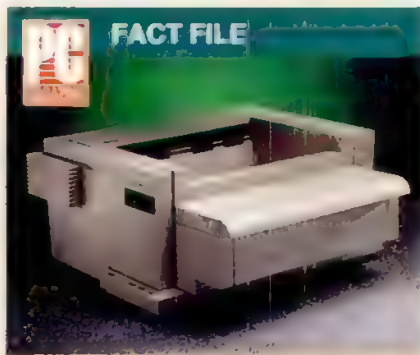
PRINT SPOOLER AND NETWORK SUPPORT

The review unit had a print spooler but no documentation for this feature. More interesting is that the TSR is meant to operate with *NetWare* (Versions 286 and 386), *VINES*, and *NetBIOS* networks, with network modules provided with the package. We did not test the printer on a network, but the company claims that the software reports on the Tidemark printers and lets you print to any one of these on the LAN.

The Tidemark is a little slow when compared with the CoStar AddressWriter operating in normal mode. On PC Magazine Labs' benchmark tests, the Tidemark system took 18.5 seconds to print one envelope without a Postnet code and 20.1 seconds with the Postnet code. When we printed an address list from *Microsoft Word*, Version 5.0, the printer managed 16 envelopes in 5 minutes with and without a Postnet code. With the FIM code added, it managed only 13 envelopes in 5 minutes.

The printer will still be selling under

HARDWARE PRINTERS



Tidemark Address Express

Tidemark Corp., 39899 Balentine Dr., #150, Newark, CA 94560-5363; 800-338-8552, 510-490-5050.

List Price: With printer, workstation and network software for DOS and Mac, serial cables for both PC and Mac, one package of labels, one ink jet cartridge, \$1,195.

Requirements: 512K RAM (for standalone system) or 640K RAM (for network), 1MB LIM EMS recommended, 4.4MB hard disk space, DOS 3.1 or later, serial port, Microsoft-compatible mouse for *Layout*.

In Short: The Tidemark Address Express offers quiet ink jet technology and special network support that will let you print to any Address Express printer on your network. But print speed and print quality are lower than you might expect for this price.

CIRCLE 469 ON READER SERVICE CARD

the Tidemark name until June of this year but not for long after that. Tidemark has entered into an exclusive OEM licensing agreement with CoStar Corp., which will in the third quarter relaunch the printer under the CoStar name. (CoStar still plans to continue selling its AddressWriter.) Tidemark said it made the deal with CoStar as Tidemark restructures its business away from marketing and sales. At review time, Tidemark was handling some support for the printer, but day-to-day user inquiries at the toll-free technical support hotline (9:00 to 5:00 P.S.T.) were already being handled out of CoStar's office. At press time, the Tidemark was shipping with a one-year warranty on parts and labor.

All told, the Tidemark Address Express package simply does not live up to its promise. Considering the technology behind it, the print quality is merely acceptable and the speed rather lackadaisical. While the *Layout* module is interesting and the network support welcome, the TSR is otherwise run-of-the-mill. Unless quiet is your single most important need, or you can make good use of the network features, it is hard to justify the price. ■

M. David Stone is a contributing editor to PC Magazine.

LabelPro. The Best Just Got Better!

NEW!
Postal Bar Code, Code 39
& more fonts!

1.



D.P. INTERNATIONAL
8801 West Baker Street
Hawthorne, NY 13041-2615

Mr. Ralph Carstens
Auto Technologies
7313 Moorhead Avenue
Hawthorne, CA 91345
Tel: (818) 444-4444

More fonts & Postal Bar Code...

2.

ACME CONSTRUCTION

17662 W. Huntington Drive
Arcadia, CA 91006

Back Up Disk 4



Disquette Labels...

3.

ACCOUNTS PAYABLE
OFFICE RENT

File Folder Labels...

4.

Acme Computer Supplies
3200 W. Green Street
Dayton, Ohio 45398

Tel: (613) 886-8280
Fax: (613) 886-8281

Specializing in repairs and maintenance
of all computers
Contact: Robert Bowman

Card Products...

Rotary Cards, Index Cards, Post Cards,
Name Tags (with plastic holders)

↓ CONTENTS

5.

Custom Tab Dividers...

LABELPRO. Software

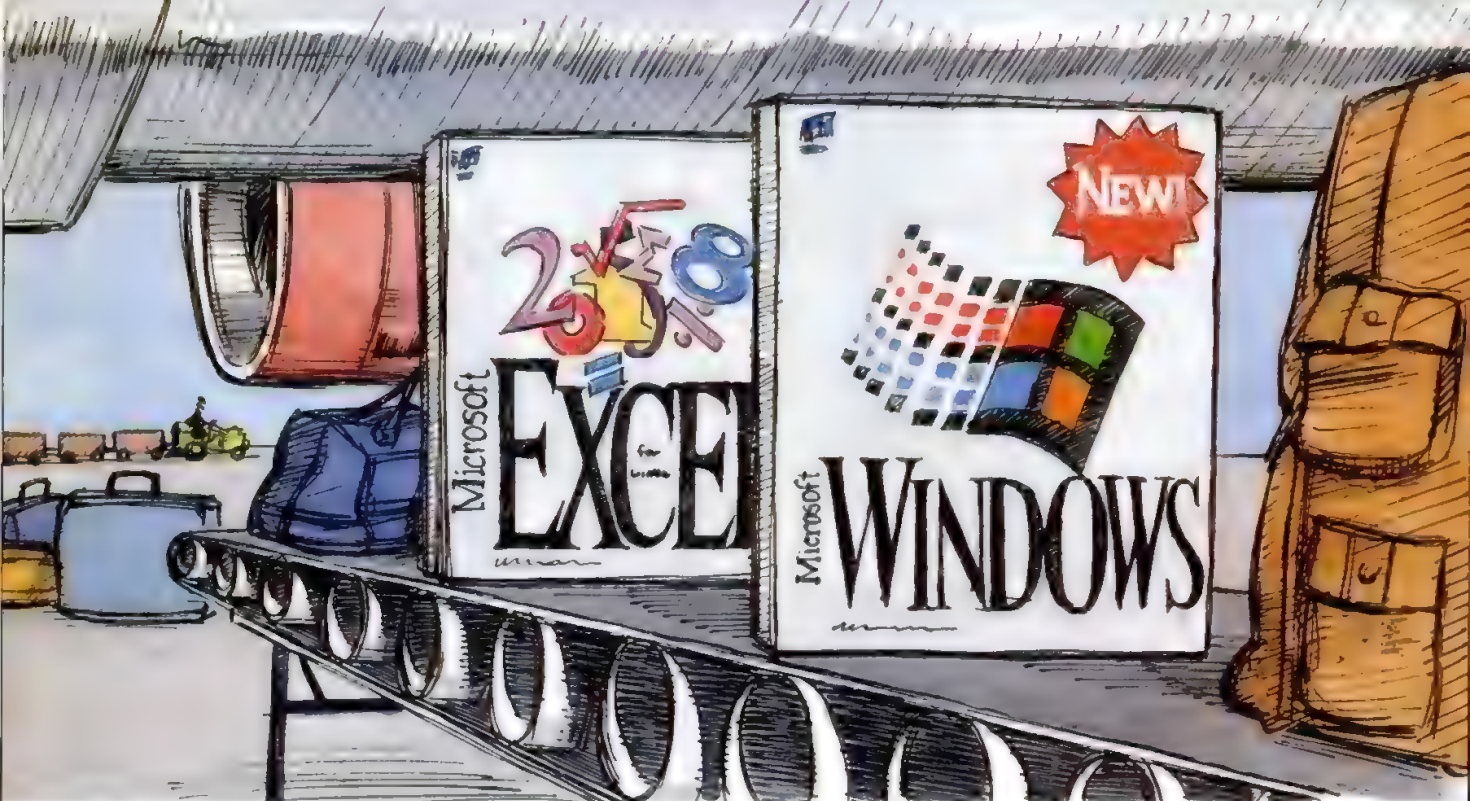
- Preset formats for Avery Laser Supplies
- Merges WordPerfect® and Word (DOS and Windows), dBASE®, WordStar® lists of any size
- Postal Bar Code, Code 39 capability
- Variety of scalable fonts
- Library of clip art or scan in your logo

Call 1-800-462-8379 for a dealer near you or upgrade information. Retail price only \$99.95



AVERY
DENNISON

Software Spectrum announces the arrival of the Windows 3.1/Excel 4.0 bundle offer.



Buy Windows 3.1 with a Microsoft mouse and Excel for Windows 4.0 for just \$449 and receive a Windows 3.1 audio training package, free.

From now until June 30, 1992, Software Spectrum is offering special bundle pricing on the two latest arrivals from Microsoft®. New users can buy Windows™ Version 3.1 with a serial or bus Microsoft Mouse and Excel Version 4.0 at the terrific Software Spectrum promotional price of just \$449 and receive a Windows 3.1 audio training tape and manual from Personal Training Systems, absolutely free. Existing users can upgrade to these new releases for an upgrade bundle price of just \$142 and still receive the training tape free.

Windows 3.1 turns your PC into a graphically-oriented, multi-application environment with the point-and-click simplicity that is Windows. And the new clipboard makes cuts, copies and pastes between applications easier than ever.

Excel 4.0 is a graphical spreadsheet that combines advanced analytical tools with remarkable ease of use. And with new 3-D charts, added fonts and colors, and accessible drawing tools, Excel makes your work look better than ever.

To take advantage of these special offers call the Software Spectrum/Microsoft WIN-WIN hotline at 1-800-824-3323 extension 5371 between 7:30 a.m. and 6:30 p.m. (Central). And do it today. Because if you've been waiting for the right time to move up to the power and ease of use of Windows and Excel, your ship just came in.

**SOFTWARE
SPECTRUM**

1-800-824-3323 ext. 5371

Software Spectrum Everyday Low Pricing

	Spectrum Price	License Pak	License Pak Upgrade	Upgrade
MS Windows 3.1	\$ 99	\$ 89	\$ 49	\$ 59
MS Excel 4.0	\$319	\$268	\$ 93	\$ 98

by
Joe Salemi

Advisor

MEMORY EXPANSION FOR PS/2s

I own an IBM Model 50, which only accommodates 1MB of memory on the system board. What are my alternatives for expanding to 4MB?

Kent Loose
Orange, California



Many add-in memory boards designed for the PS/2's Micro Channel architecture bus are available. You didn't specify whether you were looking for extended (XMS) or expanded (EMS) memory, so I've narrowed down the list to those that provide both types.

Of course, IBM (Old Orchard Rd., Armonk, NY 10504; 800-426-2468, 914-765-1900) sells memory boards for its own systems. For the Model 50, IBM offers its PS/2 80286 Memory Expansion Option (\$630), which comes with 512K of RAM, expandable to 2MB.

One memory board that provides additional ports is the RamQuest 16/32, with 512K RAM, a parallel port, and a serial port (Orchid Technology Inc., 45365 Northport Loop West, Fremont, CA 94538; 800-767-2443, 510-683-0300; \$349). It also supports up to 8MB total.

Some memory boards come without any memory chips installed. Tecmar's MicroRAM AD board (6225 Cochran Rd., Solon, OH 44139; 216-349-0600; \$390) comes with no RAM and can add up to 32MB to PS/2 386 and 486 systems (or 16MB to 286 systems). An expansion board that adds two serial ports and one parallel port is available for \$120. Finally, there's the AboveBoard MC (Intel Corp., 5200 NE Elam Young Pkwy., Hillsboro, OR 97124; 800-538-3373, 503-629-7354; \$399). It also ships with no RAM and supports up to 32MB on systems that can address that amount. Intel's I/O Option Board (\$149) adds a parallel and a serial port to the AboveBoard MC without using up another of the Model 50's already limited slots.

While researching this answer, I came

■ **MEMORY EXPANSION FOR PS/2s:** Here are some options for adding memory to IBM's PS/2 systems.

■ **REMOVING NETBIOS FROM MEMORY:** How to get network drivers out of RAM when they're no longer needed.

across a service that Intel provides called FaxBACK (800-525-3019, 503-629-7576). Anyone with a Touch-tone phone and a fax machine or card can receive Intel product specification sheets, technical tips, and price lists by calling the number and choosing the items off a voice menu. The information you've requested is then faxed back to you free of charge. The system is very easy to use and is something more hardware and software vendors should provide.

Once you've bought a memory board, you can get additional memory chips or modules from a number of mail-order sources, many of which also sell memory boards for a variety of systems. Among these companies are JDR Microdevices (2233 Samaritan Dr., San Jose, CA 95124; 800-538-5000, 408-559-1200), L.A. Trade (20930 S. Normandie, Torrance, CA 90502; 800-433-3726, 310-782-2880), First Source International Inc. (36 Argonaut, #140, Aliso Viejo, CA 92656; 800-535-5892, 714-588-9866), and Performance Memory Products (6354-B Corte Del Abeto, Carlsbad, CA 92009; 800-255-8607, 619-931-7824).

REMOVING NETBIOS FROM MEMORY

We recently installed a Token-Ring network using *NetWare* 2.15. For the most part, we have been pleased with the net-

work but we have encountered one obstacle. Some of our software requires the end user to boot with NetBIOS loaded, but other software packages we use won't run with NetBIOS loaded. Is there any way to unload NetBIOS from memory without rebooting?

Gary R. Betts
Canastota, New York



The best memory management utilities available for use with terminate-and-stay-resident programs (TSRs) like your NetBIOS driver are the *TSR Command Utilities* from TurboPower Software (P.O. Box 49009, Colorado Springs, CO 80949; 719-260-6641). Of these, the best-known are the Mark and Release pair, which mark a spot in RAM before a TSR is loaded and subsequently remove the TSR, releasing the memory it was using. The *TSR Command Utilities* also include network versions of Mark and Release, called Marknet and Relnet, which will release most network drivers when they are no longer needed. Other utilities included in the package list which TSRs are loaded in memory (Mapmem) and which device drivers are loaded (Device).

The *TSR Command Utilities* have been updated to run with DOS 5.0, and the latest version is 3.3. You can download the package from Lib 16/Gen Utils of the PC MagNet UtilForum/Tips Forum as TSR.COM.ZIP or from numerous BBSs under either that name or TSR.COM-33.ZIP. If you don't have access to a modem, you can get the utilities direct from the author for a shipping and materials fee of \$20.

ASK THE ADVISOR

Send your question to Advisor, One Park Avenue, New York, NY 10016, MCI mailbox PC MAGAZINE, or upload it to PC MagNet (see access instructions on page 10 of this issue). We regret that we are unable to acknowledge submissions or answer letters individually. ■

The Paradise® Accelerator Card for Windows. High speed and sharp picture at the right price.

See, even our ad saves you time.



For more information call Western Digital at 714-932-4900.

Paradise is a registered trademark of Western Digital. All other marks mentioned herein belong to other companies.

 **PARADISE.**
Western Digital Corporation

by
Jeff Prosize

Tutor

USING MULTIPLE START-UP FILES

In the December 17, 1991, Tutor column you published a short debug script to create a program—REBOOT.COM—for warm-booting a PC. You illustrated the program's use in BOOT.BAT, a routine designed to choose between two different pairs of start-up files. Is there some method that would allow me to pick among more than two start-up files?

Joel Samoff
Palo Alto, California

PC There sure is. Let's say you have three sets of configuration files. One boots a fully configured DOS 5.0 system, one boots Windows, and one boots a bare-bones DOS system with no TSRs or device drivers so you can run finicky programs such as disk defragmenters, which might choke with utilities like FASTOPEN loaded. Furthermore, suppose you'd like the ability to boot the configuration of your choice by typing BOOT DOS, BOOT WINDOWS, or BOOT CLEAN, respectively. Here's how to do it.

The first step is to make sure that you have a copy of REBOOT.COM. If you missed the program last time it ran, you can create it by entering the following DEBUG script:

■ USING MULTIPLE START-UP FILES: Here's a method for quickly and easily choosing among several configurations.

```
A 0100
MOV AX,40
MOV DS,AX
MOV WORD PTR [72],1234
JMP FFFF:0000
```

```
N REBOOT.COM
RCX
IB
W
Q
```

When executed, REBOOT.COM initiates a warm restart by jumping to the same BIOS code that your processor does when you turn the power on or press Ctrl-Alt-Del. You'll need to use REBOOT in a batch file to warm-boot your PC.

Second, designate a directory on your hard disk to hold the start-up files (like C:\SYSTEM), then create the files you need to boot each configuration. Use names such as DOS.SYS and DOS.BAT

(for the CONFIG.SYS and AUTOEXEC.BAT files that will boot DOS), WINDOWS.SYS and WINDOWS.BAT (for Windows), and CLEAN.SYS and CLEAN.BAT. With a choice of three start-up configurations, the directory should hold a total of six files.

Finally, create the batch file shown in Figure 1 and call it BOOT.BAT. Make certain that the directories storing BOOT.BAT and REBOOT.COM are in your PATH statement. Now simply type BOOT DOS to bring up your DOS configuration. To set up for Windows enter BOOT WINDOWS, and to boot a minimal system, type BOOT CLEAN.

BOOT.BAT copies the desired set of start-up files from C:\SYSTEM to the root directory, redirecting COPY's output to the NUL device to suppress "files copied" messages.

One benefit of this scheme is that it eliminates clutter in the root directory by permitting you to store your alternative configuration files elsewhere. In addition, you only have to copy the appropriate files to C:\SYSTEM to add more start-up options to the list.

Yet another plus is the protection you gain against impolite installation programs that modify your CONFIG.SYS or AUTOEXEC.BAT file without asking. You still have master copies stored in the C:\SYSTEM directory. If you're currently running Windows, for example, and a program modifies your start-up files, you can restore the originals to the root just by typing BOOT WINDOWS. BOOT.BAT will copy the unmodified versions of the Windows start-up files to the root directory, overwriting the changed ones.

ASK THE TUTOR

The Tutor solves practical problems and explains techniques for using your hardware and software more productively. Questions about DOS and systems in general are answered here. Send your question to Tutor, *PC Magazine*, One Park Avenue, New York, NY 10016. ■

```
BOOT.BAT  COMPLETE LISTING

@ECHO OFF
IF "%1"==" " GOTO ERROR
IF NOT EXIST C:\SYSTEM\%1.SYS GOTO ERROR
IF NOT EXIST C:\SYSTEM\%1.BAT GOTO ERROR
COPY C:\SYSTEM\%1.SYS C:\CONFIG.SYS >NUL
COPY C:\SYSTEM\%1.BAT C:\AUTOEXEC.BAT >NUL
REBOOT

:ERROR
ECHO Syntax: BOOT system, where "system" is the name of the startup
ECHO          files you want to boot from, without the .BAT or .SYS file
ECHO          name extension. Existing startup files are:
DIR C:\SYSTEM\*.SYS
```

Figure 1: The BOOT.BAT routine lets you choose from among a number of different configuration files, automatically rebooting your system with the appropriate CONFIG.SYS and AUTOEXEC.BAT files in place.

LOGICAL PRINTER SHARING

Justification

If one user prints 40 pages a day on an 8 page per minute laser printer, that printer will be in use for only 5 minutes per day! Logical Connections allow several users to easily share expensive printers and other resources, like modems and plotters. Choose the peripheral that you need from a pop-up menu.

If your company has a LAN, use Logical Connections for local printer sharing in smaller workgroups, rather than printing centrally through the LAN. Local printing is more convenient and more secure!

Versatility **LC Plus – 512Kb** \$695

All six ports of the Logical Connection Plus are automatically configured as parallel or serial, and input or output. Installation is a breeze. You just plug in your cables and run the installation software; the LC Plus will do the rest. Besides being very user friendly, the LC Plus processes data at blazing speed for any application. You can share modems and transfer files at 115,200 bps.

6 PCs or Printers/Any Combination

Practicality **LC – 256Kb** \$449

The original Logical Connection is still all the printer sharing device that most people need. The LC is ideal for printing of word processing and occasional graphics data. Its eight ports are: four bi-directional serial ports which can be set as input or output, two parallel inputs and two parallel outputs. Six users can share two parallel printers. The serial ports can also share modems.

6 PCs to 2 Printers (Typical)

Simplicity **LC Jr. – 256Kb** \$239

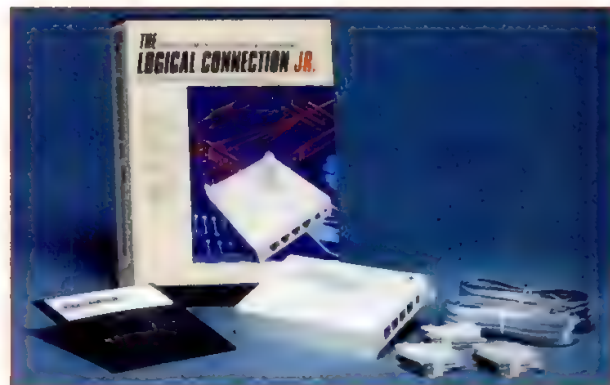
Inexpensive modular cable, even hundreds of feet in length, can be used to serially connect up to four PCs to the Logical Connection Jr. at speeds up to 115,200 bps. Plug your existing parallel printer cable into the LC Jr. and it will automatically convert the data from serial to parallel for fast parallel printing. Multiple users can send data simultaneously since the memory will buffer and queue jobs on a first-in-first-out basis.

4 PCs to 1 Printer

Logical Connection, Inc.
4660 Portland Road NE #108
Salem, OR 97305-1697

FAX: (503) 390-9372
Customer Support:
(503) 390-9375

- **Made in the USA**
- **UL Listed Power Supplies**
- **FCC Class B Certification**
(FCC Class A – LC Jr. with unshielded cables)
- **Available from Local Dealers**
- **Fast Data Input and Throughput**
- **Socketed DRAM Upgrades to 1Mb**
- **Largest Selling PSDs in the USA**



LOGICAL CONNECTION
800-238-9415 US & Canada

by
Neil J. Rubenking

User-to-User

RUNNING UNDER WINDOWS?

When I load a DOS program, I'd often like to know whether I'm running it from within a Windows DOS shell or from the DOS prompt alone. I could then, for example, write batch files that would first display a screen explaining how to hotkey back into Windows and then run the application. Obviously, such a message isn't necessary if it already has been determined that you aren't running the program from within a Windows DOS shell.

I discovered that when Windows is running, it creates an environment variable, `windir`, that is sent to the Windows directory. Unfortunately, DOS and high-level programming languages convert all references to environment variables to uppercase letters, but Microsoft chose to make `windir` lowercase, probably so that the `SET` command couldn't create it outside of Windows or delete it while in Windows. Thus, for any reference to the `windir` variable, DOS actually looks for `WINDIR`, which of course cannot be not found.

To circumvent this problem, I wrote a

RUNNING UNDER WINDOWS? Here are three ways to tell whether your batch files are executing under Microsoft Windows.

small assembly language program that scans the environment block looking for `windir`. If `windir` is found, the program returns an `ERRORLEVEL` of 1; if not, it returns an `ERRORLEVEL` of 0. To assemble the program, simply type the hex code from the listing in Figure 1 into an ASCII text file named `INWIN.SCR`, and then enter the line

```
DEBUG < INWIN.SCR
```

at the DOS prompt, making sure that `DEBUG.COM` is in the current directory or on your `PATH`.

Using `INWIN` is very straightforward. To determine what `INWIN` returned, just use the `IF ERRORLEVEL` batch file command:

```
...
INWIN
IF ERRORLEVEL 1 GOTO InWindows
ECHO You are NOT in Windows!!!
GOTO Skip
:InWindows
ECHO You ARE in Windows!!!
:Skip
...
```

You can also use `INWIN` to make sure that certain programs, such as `CHKDSK`, are not run while in Windows. Some programs shouldn't be run under Windows, yet they are not Windows-aware. To prevent a disaster, simply rename the original program to something obscure (like `XCHKDSKX.EXE` for `CHKDSK.EXE`) and create a batch file with the original name (`CHKDSK.BAT`). If run under Windows, the batch file can display a message explaining that `CHKDSK` cannot safely run under Windows; otherwise it can call the renamed program and let it run as usual.

Christopher J. Stein
Durham, North Carolina

INWIN.SCR	COMPLETE LISTING
NINWIN.COM A100 MOV AX,[002C] MOV ES,AX MOV DI,0000 ; ES: MOV AL,[DI] CMP AL,00 ; JZ 0134 JZ Exit ; MOV SI,013D ; MOV BL,[SI] CMP BL,00 ; JZ 012F JZ Label3 ES: MOV AL,[DI] CMP AL,BL ; JNZ 0124 JNZ Label4 INC DI INC SI	; JMP 0112 ; INC DI ES: MOV AL,[DI] OR AL,AL ; JNZ 0124 JNZ Label4 INC DI ; JMP 0100 JZ Label1 ; MOV BYTE PTR [013C],01 ; MOV AH,4C MOV AL,[013C] INT 21 E13B 0, 0, "windir=", 0 RCX 45 W Q

Figure 1: Redirect this file into `DEBUG` to produce `INWIN.COM`. You can omit the comment lines (those beginning with a semicolon) if you wish.

Though environment variables can have both uppercase and lowercase letters in their *values*, DOS normally converts their *names* to all uppercase letters. Within a batch file, you can spell the name of an environment variable using any combination of uppercase and lowercase letters:

```
ECHO TEMP is "%temp%"
ECHO TEMP is "%TEMP%"
ECHO TEMP is "%Temp%"
```

The case you use for the variable name doesn't matter, because DOS converts it to uppercase before searching the environment for that variable. And indeed,

CHKDSK.BAT

COMPLETE LISTING

```
@ECHO OFF
REM You *MUST* rename CHKDSK.EXE to XCHKDSKX.EXE and put this
REM batch file on your PATH before you use it.
INWIN
IF ERRORLEVEL 1 GOTO YesWindow
ECHO You're not in Windows, so CHKDSK is fine.
XCHKDSKX
GOTO End
:YesWindow
ECHO Sorry, it's not safe to run CHKDSK.EXE under Windows.
ECHO Exit Windows and try it again.
:End
```



Figure 2: This batch file uses INWIN.COM to prevent you from accidentally running CHKDSK under Windows.

CHKDSKB.BAT

COMPLETE LISTING

```
@ECHO OFF
REM You *MUST* rename CHKDSK.EXE to XCHKDSKX.EXE and put this
REM batch file on your PATH before you use it.
IF EXIST INWINDOW.$$$ DEL INWINDOW.$$$
QBASIC /RUN INWIN.BAS
IF EXIST INWINDOW.$$$ GOTO YesWindow
ECHO You're not in Windows, so CHKDSK is fine.
XCHKDSKX
GOTO End
:YesWindow
DEL INWINDOW.$$$
ECHO Sorry, it's not safe to run CHKDSK.EXE under Windows.
ECHO Exit Windows and try it again.
:End
```



Figure 3: INWIN.BAS signals that Windows is running by creating a 0-byte file INWINDOW.\$\$\$.

```
IF ENVIRON$("windir") < > "" THEN
  OPEN "inwindow.$$$" FOR BINARY
  AS #1
  CLOSE #1
END IF
SYSTEM
```

Figure 3 is CHKDSKB.BAT, a modified version of CHKDSK.BAT that uses this simple QBASIC program instead of INWIN.COM.

Finally, it's possible to detect whether or not you're running under Windows without using *any* special program—not a .COM file, not a BASIC program, just DOS commands, both internal and external.

CHKDSKC.BAT (Figure 4) pipes the output of the SET command through the FIND filter, seeking the string "windir=", and redirects the result into the temporary file TEMP0001.\$\$\$.

Unless the windir variable exists, TEMP0001.\$\$\$ will be a 0-byte file. The next line copies the temporary file to TEMP0002.\$\$\$, but the COPY command won't copy 0-byte files. Hence, if TEMP0002.\$\$\$ exists after that command, the windir variable was present, and the batch file is executing under Windows.

CHKDSKC.BAT

COMPLETE LISTING

```
@ECHO OFF
REM You *MUST* rename CHKDSK.EXE to XCHKDSKX.EXE and put this
REM batch file on your PATH before you use it.
IF EXIST TEMP0001.$$$ DEL TEMP0001.$$$
SET | FIND "windir=" > TEMP0001.$$$
COPY TEMP0001.$$$ TEMP0002.$$$ > NUL
DEL TEMP0001.$$$
IF EXIST TEMP0002.$$$ GOTO YesWindow
ECHO You're not in Windows, so CHKDSK is fine.
XCHKDSKX
GOTO End
:YesWindow
DEL TEMP0002.$$$
ECHO Sorry, it's not safe to run CHKDSK.EXE under Windows.
ECHO Exit Windows and try it again.
:End
```



Figure 4: Without using anything but DOS commands, this batch file detects the windir variable in the environment and thereby knows whether Windows is running or not.

using this process, DOS will never find the windir variable, because DOS will be searching for WINDIR. INWIN.COM looks for the specific lowercase string windir.

CHKDSK.BAT, shown in Figure 2, illustrates just how you might use the INWIN.COM program in order to pre-

vent accidentally damaging your hard disk. If INWIN returns an ERRORLEVEL of 0, the batch file runs CHKDSK.EXE, which has been renamed XCHKDSKX.EXE. If it returns an ERRORLEVEL of 1, the batch file prints a warning message and doesn't run the CHKDSK program.

SHARE YOUR SECRETS

Reveal your latest DOS and systems discoveries through User-to-User; we'll pay you \$50 for any submission that we print. Please submit your letter on-disk together with a printout. Mail your contribution to User-to-User, *PC Magazine*, One Park Avenue, New York, NY 10016, or upload it to PC MagNet (see page 10 for access instructions). We regret that we are unable to acknowledge submissions or answer letters individually.

by
M. David Stone

The Working Word

HYPHENS IN WORDPERFECT

Program listings and downloads from bulletin boards often include a lot of hyphens. If you retrieve this straight-ASCII text into *WordPerfect* (in both Versions 5.0 and 5.1, using Shift-F10 or using F5 to see a list of files and then choosing Retrieve), trying to work with these hyphens can be annoying.

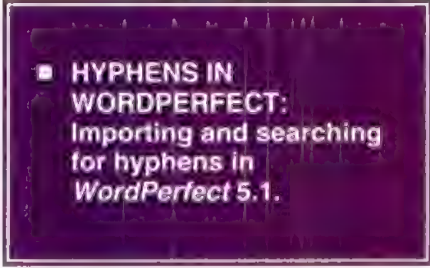
The characters show on-screen as hyphens, but that is not the whole story. If you save the document and then look at it in hex format with DEBUG or the equivalent, you'll see that the characters are stored as ASCII character 2D hexadecimal, or 45 decimal. To look at the document with DEBUG, enter

DEBUG filename

at the DOS command line. Then use the D command at the DEBUG prompt (which, coincidentally, appears as a hyphen) to dump the file to the screen piece by piece in hex format. But if you try searching for or replacing these hyphens in *WordPerfect* by pressing the Hyphen key, the program can't find them. Nor can *WordPerfect* find the hyphens if you enter the search string by holding the Alt key down, entering 45, and releasing the Alt key to enter the ASCII value for a hyphen.

If you use DEBUG to look at a document that includes hyphens created by typing the Hyphen key from within *WordPerfect*, you'll find that *WordPerfect* uses the ASCII character A9 hex, or decimal 169, not ASCII 45 to represent this kind of hyphen.

This explains why *WordPerfect* can't find the hyphens that it has imported from other applications, but it doesn't help find them with a search or search-and-replace command. The solution is to use the import DOS Text feature importing the file by choosing Ctrl-F5, then DOS Text, then Retrieve (CR/LF to [SRT] in HZone). When *WordPerfect* imports the text with this option, it will also convert any ASCII 45 characters to ASCII 169. Note that if you



■ HYPHENS IN
WORDPERFECT:
Importing and searching
for hyphens in
WordPerfect 5.1.

choose the Retrieve (CR/LF to [HRT]) option, *WordPerfect* will not convert the characters.

Bart Veerman
Hamilton, Ontario
Canada



These comments are absolutely correct as far as they go. (As a matter of fact, they apply to *WordPerfect*, Version 4.2, as well, though with Version 4.2 you choose the DOS text retrieve option in one step rather than two.) The actual situation, however, is just a bit more complicated. *WordPerfect* recognizes three different kinds of hyphens: the hyphen character, the hard hyphen, and the soft hyphen.

The hyphen character and the hard hyphen are always visible on the standard editing screen. The difference between the two is that the hyphen character indicates an acceptable position for a line break, while the hard hyphen does not. Hard hyphens are meant only for "words" like 1-2-3, where you don't want a line break. The soft hyphen indicates an acceptable position for a line break, but only prints or shows on the standard editing screen when the word is hyphenated at the end of a line.

WordPerfect uses ASCII 169 (A9 hex) for the hyphen character (entered by typing the Hyphen key), ASCII 45 (2D hex) for the hard hyphen (entered by hitting the Home key, followed by the Hyphen key), and ASCII 172 (AC hex) for the soft hyphen (entered by holding down the Ctrl key while pressing the Hyphen key). That means you can search for or replace

any of these characters, as long as you know which kind you're looking for. Simply enter the appropriate kind of hyphen in the search string, using *WordPerfect*'s usual keystrokes—hyphen, or Home then Hyphen, or Ctrl-Hyphen, as appropriate.

Although all three kinds of hyphens look exactly the same when you view them on the standard editing screen, they appear differently when you enter them in the search string or view them with the Reveal Codes. The hyphen character will appear in boldface, as [-], the soft hyphen as a boldfaced -, and the hard hyphen will appear as a nonboldfaced -.

WordPerfect for Windows differs slightly from *WordPerfect* for DOS in keystrokes and terminology. *WordPerfect for Windows* calls the hyphen character a *regular hyphen* and the hard hyphen a *dash*, though both types of hyphens use the same ASCII characters as their equivalents in *WordPerfect* for DOS and both behave the same way.

DOS *WordPerfect* users who are planning to move to *WordPerfect for Windows* also need to know that the hard hyphen, or dash, is entered with Ctrl-Hyphen in the Windows version, not Home, Hyphen. The soft hyphen is entered by typing Ctrl-Shift-Hyphen. Also, the Reveal Codes screen uses shading rather than boldface to indicate codes. Otherwise, the different kinds of hyphens function much the same way in both DOS and Windows versions.

TIPS FROM WORKING WORDSMITHS

Tell the Working Word your latest word processing discovery; we'll pay you \$50 for any tip we print. Please send your contribution on-disk along with a print-out to The Working Word, *PC Magazine*, One Park Avenue, New York, NY 10016, or upload it to PC MagNet (see page 10 for access instructions). We regret that we are unable to acknowledge submissions or answer questions individually. ■

The Best \$ Controllers In The Business

The #1 concern with most businesses today is controlling costs. That's why more and more companies are turning their backs to the high-priced brands and buying DTK. Without compromising speed, dependability or affordability, DTK enables businesses to control costs while maintaining quality and performance.

When PC Magazine recently reviewed 24 models of i486/33" computers, DTK topped the price/performance index. PC Magazine summed it up by saying "the real bang-for-the-buck comes from the low priced ISA-based system from...DTK."

In PC Labs' disk performance tests, DTK's FEAT-3300 series finished second overall and **first** among those with non-cached drive controllers, completing the test an **amazing 63% faster** than our nearest competitor, IBM. And if it's cache control you want, look to DTK for caching IDE and SCSI controllers.

DTK designs and manufactures everything from chipsets and motherboards to full systems with keyboards and monitors. With over 20 offices nationwide, and regional manufacturing facilities in 5 states, DTK is big enough to supply your needs yet flexible enough to meet your budget. We can configure just about any system to meet your requirements. You only pay for what you need.

And as a charter member of the Novell Labs Certification Alliance, DTK systems will fulfill your networking and interoperability needs. Our FEAT-3331 vertical model offers a full complement of 5 accessible 5.25" drive bays, plus a full-height drive bay inside for your expansion needs.

For the DTK dealer nearest you, call:

1-800-827-9DTK

"From a strictly price/performance point of view, no other machine can beat the...DTK"

PC Magazine, February 11, 1992

"The DTK FEAT 3300 (series) with its IDE hard disk turned in the best uncached disk score"

PC Magazine, February 11, 1992



DTK Computer Inc. Making Quality Affordable™
17700 Castleton Street, Suite 300 / City of Industry (Los Angeles), CA 91748 / (818) 810-8880 / Fax (818) 810-5233

Los Angeles
(818) 810-0098

Houston
(713) 568-6688

Chicago
(708) 593-3080

New York
(908) 562-8800

Miami
(305) 597-8888

© 1992 DTK Computer Inc. DTK monitor logo is a registered trademark of Datatech Enterprises Co., Ltd. Making Quality Affordable is a trademark of DTK Computer, Inc. The Intel Inside Logo is a trademark of Intel Corporation. All other brand names are trademarks or registered trademarks of their respective companies.

GSA# S00K92AGS6004

CIRCLE 102 ON READER SERVICE CARD

by
Craig Stinson

Spreadsheets

EXCEL DATABASE PRINT AREAS

I like to use *Microsoft Excel* for simple database applications, but I sometimes forget to update my print range after adding new records. Rather than making printouts that don't include the latest records, I link my Print_Area and Database ranges so that they always stay in sync. I use *Excel*'s Formula Define Name command and assign the following formula to the name Print_Area:

```
= $E$2 : INDEX (DATABASE, ROWS (DATABASE)  
, COLUMNS (DATABASE) )
```

This assumes that my Database range starts at E1. I leave the top row of the database out of the Print_Area range, because I use that row as my Print_Titles range. If I included it (by setting Print_Area equal to Database), then my titles would be printed twice on each page.

Robert Lance Preston
Arlington, Texas



If you use *Excel*'s Form command to add new records to a database, the definition of the Database range automatically expands to include the new records, saving you the trouble of returning to the Define Name dialog box. Unfortunately, *Excel* will not automatically expand the range named Print_Area. One way you can avoid the mismatch of Print_Area and Database is simply to devote your entire worksheet to the database and never define a print area. If you never create a range named Print_Area, *Excel* always prints the entire populated area of your worksheet.

Mr. Preston's use of the INDEX () function in the Define Name dialog's Refers to box is a more generally applicable solution. You can make his solution even more general by using INDEX () at both ends of the reference. The formula

```
= INDEX (DATABASE, 2, 1) : INDEX (DATABASE  
, ROWS (DATABASE) , COLUMNS (DATABASE) )
```

- **EXCEL DATABASE PRINT AREAS:** Keep your *Excel* database's print area current.
- **SETTING WYSIWYG PRINTER DEFAULTS:** You don't have to select a printer every time you bring a new worksheet into Wysiwyg.

relieves you of the need to hard-code the upper-left corner of the print region.

A simpler formula that works almost perfectly is =OFFSET (DATABASE, 1, 0). The reference returned by this formula has the same size and shape as the range named Database but starts at Database's second row. If you don't mind including an extra blank row at the end of your printouts, this alternative works just fine.

SETTING WYSIWYG PRINTER DEFAULTS

Many users who have recently installed *Lotus 1-2-3*, Release 2.3, experience problems printing from the Wysiwyg add-in. Some of these problems occur because no printer has been selected when the user chooses the :Print Go command. Before printing, the user must choose the :Print Config Printer command and pick from the list of installed printers.

When you first install Wysiwyg, you can specify all the printers you expect to be using. But the installation program does not actually select the printer you'll print with. You have to make this selection manually after you begin using Wysiwyg.

When you save a new worksheet after choosing a printer, Wysiwyg saves the selected printer along with the worksheet and formatting data. Unfortunately, this information is lost when you start a new worksheet at your next session.

Fortunately, there is a way to record a printer selection for all newly created worksheet files. To do this, you must update the Wysiwyg configuration file, WYSIWYG.CNF, which stores all the default settings that 1-2-3 uses when you attach the add-in. This update command, however, is not located in a place where you would expect to find it.

The :Print menu has no Update command, but the :Display menu does have one. Choosing :Display Default Update writes all the current default settings, including the default printer selection, to the WYSIWYG.CNF file. So if you want Wysiwyg to assign a particular printer to all newly created worksheets, you must first use :Print Config Printer to specify which printer, then :Default Display Update to record your choice.

James R. De Carli
Naugatuck, Connecticut



Mr. De Carli is right. Most of the settings stored in WYSIWYG.CNF have to do with the appearance of your screen, but this configuration file also records your default printer. Unless you explicitly put a printer choice into this file in the manner described by Mr. De Carli, Wysiwyg will play dumb at the beginning of each working session. If you have had trouble discovering that you have to use :Display Default Update to register your favorite printer, one can hardly blame you.

For more details about the information recorded in WYSIWYG.CNF, see the bullet list on page 281 of the Release 2.3 user guide.

HINTS, TIPS, QUESTIONS

Share your latest spreadsheet discovery through *PC Magazine*'s Spreadsheets. We'll pay you \$50 for any tip we print. Please submit your letter on-disk, together with a printout. Mail your contribution to Spreadsheets, *PC Magazine*, One Park Avenue, New York, NY 10016, or upload it to PC MagNet. ■

UDS LanFast™ network modem puts your node on the road



Access to local area networks now extends well beyond the office walls, thanks to the new LanFast DM 20 from UDS.

The LanFast DM 20 is a LAN-resident dial-in/dial-out device, with a built-in V.32 bis/V.42 bis modem and Ethernet LAN adapter card. Its presence on a Novell LAN enables your "road warriors" to access the network, using a standard modem, from any place that offers a standard telephone jack.

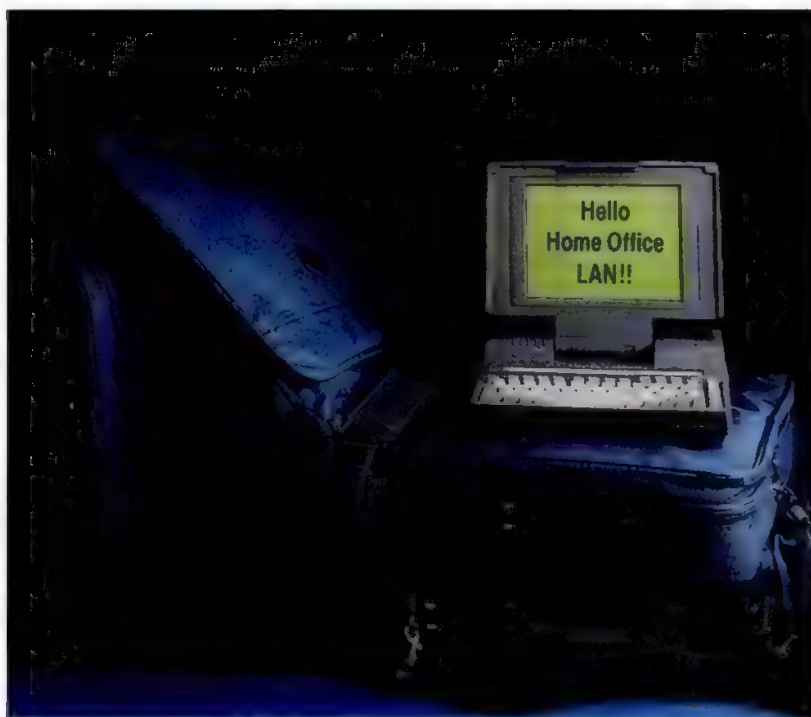
The unit supports thick, thin or 10BaseT Ethernet, giving remote users and local nodes the same access to E-mail, shared databases and other network resources. Three levels of security deny access to unauthorized users, and a second high-speed serial port extends network reach by accommodating an external modem or high-speed digital device.

LanFast DM 20 is shipped with all necessary hardware and software. For remote access, it supports standard modems at speeds to 57.6 kbps and popular communications programs such as Procomm Plus Network and Crosstalk Mk. IV.

If your people on the move need everyday access to their home-base LANs, let them take a node on the road. For full details, contact UDS at:

800/451-2369.

CIRCLE 367 ON READER SERVICE CARD



UDS

 **MOTOROLA**

by
Frank J. Derfler, Jr.

Connectivity

POWER AT A DISTANCE

I run a one-man office and would like to gain control of my computer from home. The software part is easy, but I can't figure out a way to get the office system to turn on and off remotely. Do you know of any device that can power the machine up or switch it off by phone?

Doug Kanter
Rochester, New York

PC MAGAZINE The folks from Server Technology Corp. (408-988-0142) have a telephone-activated power-control unit called Remote Power On/Off that can solve your problems. If you don't want to leave your remote access server on all the time, this \$169 product turns it on when the phone rings and turns it off after the call. Even if you do leave your access server on all the time, Remote Power will drop the AC power after a call is finished, wait a few seconds, and then apply power again. This feature eliminates those frustrating problems with hung remote-controlled PCs.

Remote Power detects an incoming call, provides power to devices plugged into its special wall-socket adapter, monitors the status of the telephone line, and drops the power at some preselected period after the connection is broken. If you can disable your PC's memory check in ROM BIOS to shorten the boot time, this arrangement works fine for infrequently called systems.

In many offices, though, the problem is different. Organizations want to keep PCs that act as access servers running, but sometimes applications freeze. A frozen PC can put the remote access capability out of service until someone physically resets the system—a problem at night and on weekends. The reboot feature of Remote Power ensures that the access server comes back up with a fresh boot after every call. You lose only a few seconds of time between calls, and you completely avoid the problem of frozen remote access servers.

■ **POWER AT A DISTANCE:**
We present a product that can control power to devices over the phone.

■ **FOLIO HELPS MANAGE E-MAIL PACK RATS:**
A look at a product that can assist in stemming your LAN's e-mail inundation.

FOLIO HELPS MANAGE E-MAIL PACK RATS

The toughest problem I face as a *NetWare* network administrator comes from people who squirrel away their old electronic-mail messages. We started limiting the amount of space for message storage on the server, so now they keep old e-mail files on their local hard disks and put applications on the network. Some users store the same messages in different subdirectories so they can find them when they want them. Is there anything I can offer these people that will reduce the size of their e-mail files while still helping them find what they need?

William Johnson
Chicago, Illinois

PC MAGAZINE The good news is that you seem to have a group of people who find value in your e-mail system. The bad news is that those old e-mail files can occupy a lot of expensive storage space. Folio Corp. (801-375-3700) has a product called *Folio MailBag* that archives, compresses, and retrieves e-mail messages on *NetWare* LANs. Out of the box, it works with popular e-mail systems like Action Technologies' *The Coordinator*, *Da Vinci eMail*, Lotus's *cc:Mail*, *Microsoft Mail*, and *WordPerfect Office*. *MailBag* can also be customized to work with other e-mail programs.

As part of the installation, you create a special .COM file shell routine with the same name as your e-mail's .EXE file. When you enter the name of the program on the command line, the .COM file runs first and starts the .EXE file. *MailBag's* .COM file intercepts the Ctrl-A keystroke and sends the appropriate keystrokes to the .EXE file, telling it to archive the message you select. The e-mail program thinks it's sending the message to its own archive, but it is really sending that message to *MailBag*.

If you've ever used the *NetWare* HELP utility, you've used a Folio product. *Folio Views* serves as the text search engine and viewer provided by Novell in every box of *NetWare* 2.x and 3.x. When you archive e-mail messages with *MailBag*, the program adds them to an infobase that you can easily search and read with *NetWare's* *Folio Views*. The infobase indexes every word and categorizes the e-mail by date, sender, and topic. You can use *Views* to search for specific words quickly. Use wildcards and *Views* will even show you the closest match.

Using *MailBag*, each person creates a password-protected infobase of archived mail on the server. Instead of taking up space in many different subdirectories, the messages are compressed, easy to find, and easy to edit. Folio can sell *MailBag* for the low price of \$295 for 25 users because Novell already provides the viewing engine.

NETWORK YOUR QUESTIONS

Connectivity gives you practical solutions to networking problems of all types. We'll pay you \$50 for any tip we print. Please submit your letter on-disk along with a printout. Mail your contribution to Connectivity, *PC Magazine*, One Park Avenue, New York, NY 10016. You may also contact Frank J. Derfler, Jr., via MCI Mail (MCI ID: 240-2931) or the PC Magazine LAN Labs fax machine (904-267-1578). We regret that we are unable to answer letters individually. ■

by
Scott McGrath

PC MagNet

AutoSIG, *CISOP*, and *TAPCIS* are the workhorses of forum access, each providing a fully automated, unattended on-line access mode that negotiates both the on-line session and off-line processing of information with thrift and finesse.

All three programs work by making automated "passes" at CompuServe and ZiffNet. The programs move among selected forums automatically, treating on-line forum access as a two-step process. First, they dial the network and issue scan commands (reading only the titles of messages) in the forum's message sections, and optionally gather file descriptions from forum libraries on the basis of filename, keywords, or age. They also read ASCII or binary private mail and

■ **AUTOMATED ACCESS SOFTWARE, PART 2:**
More advanced programs that streamline your use of ZiffNet.

collect waiting personal messages in forums. They then disconnect, allow the user to select messages and files of interest, then reconnect to the network to read the messages and download the files that have been selected off-line.

Once off-line, each program has a message editor that will automatically

address replies to existing messages or let you compose new messages. The editor also offers basic thread-management utilities and a mechanism for handling catalogs of a forum's file descriptions. In addition, each provides a conference chat mode, some scripting capabilities, and a means of automatically joining forums and keeping forum information up to date.

AutoSIG, commonly referred to as *ATO* (the *SIG* in its name derives from *special interest group*, which the *forum* used to be called on CompuServe), is the greatest bargain among these three packages. Entirely free, it is well supported on the *CIS:IBMCOM* forum on CompuServe. Some feel that *ATO* is not as easy to set up and use as either *CISOP* or *TAPCIS*, but since it costs only the price of a download to try the program out, this might be a judgment you'll wish to make for yourself. *ATO* provides all the basic services described above (the two-step automatic pass and so forth), and if you browse the Utilforum and IBMCOM libraries on the keyword *AUTOSIG*, you'll find that others have added to its features in various scripts and utilities. If you're on a budget and are willing to tolerate slightly less convenience in setup and operation, *ATO* is a good choice.

TAPCIS is perhaps the favorite among regular forum participants—popular enough to generate quite a collection of *add-ons*, programs that extend its native functions. Indeed, a decision between *TAPCIS* and *CISOP* should really involve a comparison of the cost of *TAPCIS* and add-ons versus the cost of *CISOP* and the Crosstalk versions needed to run it; currently, native *CISOP* provides a number of features available to *TAPCIS* only through add-ons. *TAPCIS* users tend to be loyal, despite a user interface that seems somewhat esoteric at first glance; once you learn the program, the interface becomes much more clear. *TAPCIS* borrows a lot of its user interface conventions from *WordPerfect* (for example, its editor uses F7 for Exit), so if you're comfortable



WHERE TO FIND AUTOMATED ACCESS PROGRAMS

Software name	Location
CompuServe Information Manager (CIM)	GO CIS:CIM for ordering information and support
ZiffPlus	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips File: ZIFF.ZIP Support: GO ZNT:UTILFORUM
TAPCIS	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips Files: TAPCIS.INF (information file) GO CIS:TAPCIS, Lib 1, TAPCIS: TAP.EXE, TAPDOC.EXE Support: GO CIS:TAPCIS
TAPCIS/PM	GO CIS:TAPCIS, Lib 15, TAPCIS/PM Information file: TAPPM.REL Support: GO CIS:TAPCIS
CISOP	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips Files: CISOP.TXT (information file), CISOP.EXE, CISDOC.EXE, CISHLP.EXE Support: GO CIS:CISOP or GO CIS:XTALK
AutoSIG	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips Files: ATO68B.REQ (information file), ATOEXE.EXE, ATODOC.EXE Support: GO CIS:IBMCOM
RECON	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips Files: RECONI.ZIP (information file), RECON.ZIP, RECOND.ZIP
TAPPET	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips File: TAPPET.ZIP
TAPMARK	GO ZNT:UTILFORUM, Lib 14, ASP Utilities File: TAPMRK.ZIP
TAPORDER	GO CIS:TAPCIS, Lib 2, Scripts and Tools File: TAPORD.ZIP
CATSCAN	GO ZNT:UTILFORUM, Lib 11, CIS Navigation Tips File: CATSCN.EXE

with the word processor, you won't find *TAPCIS* too difficult.

If you're evaluating auto-navigation programs, you should download the shareware version of *TAPCIS* and give it a try. In addition to excellent features for forum access, *TAPCIS* is highly configurable and easy to use after initial setup.

Some favorite add-ons for *TAPCIS* that are particularly useful include *TAPPET*, an intelligent thread-marking program that allows you to point and shoot message titles during a first pass through the service and also remembers which message titles you selected in previous sessions (an older utility, *TAPMARK*, performs similar functions); and *CATSCAN*, a file description processor that helps manage forum download-library titles and also compresses file catalogs, which can grow quite large. *CATSCAN* has a very idiosyncratic user interface, but if you download many file descriptions and library catalogs, it can certainly be useful.

Two other utilities perform roughly the same message-management functions, but by radically different means. *RECON* is a message processor that provides a full-featured environment for reading and replying to messages, sorting and archiving them, and seeing different index-style views of them; *TAPORDER*, on the other hand, provides sorting and archiving message management primarily from the command line. *RECON* is very convenient and adds some intelligent enhancements. *TAPORDER* works as a message processor that rethreads messages and marks them for viewing from within *TAPCIS* and provides a small TSR for tagging messages from within *TAPCIS*.

CISOP does indeed match most of the features of *TAPCIS* and many of the features of the *TAPCIS* add-ons as well, and is testimony to the power of Crosstalk's CASL scripting language. To call the program mere scripting is misleading, in fact, because *CISOP* is as full-featured and powerful as the standalone communications programs discussed here. To run it requires that you first purchase a copy of *Crosstalk XVI* or *Crosstalk Communicator*; *CISOP* itself is available as inexpensive shareware. It offers excellent forum configuration, thread sorting, and archiving options. It's a very powerful way to access CompuServe and ZiffNet.

NOW EVERYONE CAN GET A SPEEDY TRIAL.

Introducing Demos Showcase from ZiffNet, the on-line information service that's all about computing. Now you don't have to wait to get the hottest software demos. Choose from the hundreds of demos available in our library, including Harvard Graphics for Windows and the latest releases of Lotus 1-2-3. And then download them—immediately!—to see if the product meets your needs. For more information about Demos Showcase and other Buyer's Services on ZiffNet—from product specs to reviews, to Editor's Choice listings—call 1-800-866-0330. And start getting the demos you want without the wait.



ALL ABOUT COMPUTING...ON-LINE

CompuServe and ZiffNet members type GO ZNT:DEMOS. ©1992 Ziff Communications.

CIRCLE 085 ON READER SERVICE CARD

**GET NONSTOP
SYSTEMS
INFORMATION...
AND 2
DISKS —
FREE!**



Subscribe to PC Magazine now and you'll also get the "Best of PC Magazine's Utilities" on 2 disks — **FREE** with your paid subscription! These exclusive power programs are guaranteed to enhance your DOS, video and printer capabilities at the touch of a key!

ONE YEAR
(22 issues) for \$29.97.
YOU SAVE 54%!

TWO YEARS
(44 issues) for \$49.97.
YOU SAVE 62%!

Call toll-free today: 1-800-289-0429

Full one-year subscription price is \$44.97. Please add \$32 per year for postage outside the U.S. U.S. currency only. Canadian GST included. Please allow 30 days for delivery. Your disks will be shipped upon payment.

by
Bob Flanders and
Michael Holmes

Utilities

If you frequently have to download files from a communications or information service, you've probably wished you could dedicate a second computer or a secretary to the task. Long downloads tie up your machine and keep you from getting back to more productive work.

BACKDOWN will get you back to work right away. A TSR (terminate-and-stay-resident) utility, BACKDOWN lets you start and manage communications sessions and file downloads in the background while you continue working in your foreground application. You can run BACKDOWN interactively, or you can use its script facilities to automate all or part of its operations.

Specifically, BACKDOWN provides five major functions: a "dumb terminal" interface, script execution, a script compiler, protocol-based download capability, and background execution. The program requires DOS, Version 3.1 or later, and occupies about 16K when resident in memory.

You can get a copy of BACKDOWN and its related protocol files (discussed below) by downloading the BD.ZIP file from PC MagNet, as explained in the sidebar "Downloading Utilities." If you don't have a copy of Phil Katz's shareware program PKUNZIP, you should also download PCUNZIP.COM, the utility presented in this column in the March 24, 1992, issue; either one will break out and decompress the group of files contained in BD.ZIP.

If your communications software cannot handle binary files, you can download the ASCII files BD.BAS, BXMODM.BAS, BBPLUS.BAS, and BASCII.BAS instead. Running these BASIC listings will produce the .EXE and .BDP files needed for BACKDOWN.

PC MagNet also makes available to you a complete set of source code files, in case you wish to study or customize them. The source can be assembled with MASM 5.1 or 6.0 or Borland's Turbo Assembler 2.5 or 3.0. (Other assemblers may work,

You Can End the Download Delay with BACKDOWN.EXE

■ If you're tired of shutting down your current application to pick up your e-mail, here's a utility that lets you download in the background while you continue to work.

but we have tested it only using these.) Using the Microsoft assembler, you create BD.EXE from its .ASM source with the two commands

```
MASM BD;
LINK BD;
```

The statements needed to assemble the BACKDOWN downloading protocol files are as follows:

```
MASM BXMODM;
LINK BXMODM;
EXE2BIN BXMODM BXMODM.BDP
```

```
MASM BBPLUS;
LINK BBPLUS;
EXE2BIN BBPLUS BBPLUS.BDP
```

```
MASM BASCII;
LINK BASCII;
EXE2BIN BASCII BASCII.BDP
```

Note that if you know assembly language, BACKDOWN provides a fairly simple interface for adding further protocol

modules, without requiring you to re-compile the main program.

BRINGING UP BACKDOWN

The full syntax for BACKDOWN is

```
BD [/Pn/Hxxx,i] [/Bz] [/C script]
[/T] [/U] [script [operands]]
```

Note that all the command line parameters shown are optional. If you simply enter BD alone, BACKDOWN will be loaded into memory with the following defaults: COM1, 2,400 bps, no parity, 8 data bits, 1 stop bit, 7-bit screen display, automatic recognition of the Compu-Serve B+ protocol enabled, and a script file buffer size of 1K. The command line parameters specifically related to operating BACKDOWN from a script rather than interactively are explained in the sidebar "Creating and Using a BACKDOWN Script."

The /Pn command line switch lets you specify any of the standard PC COM ports as follows:

```
/P1 = Port 3F8 Interrupt 4 (COM1)
/P2 = Port 2F8 Interrupt 3 (COM2)
/P3 = Port 3E8 Interrupt 4 (COM3)
/P4 = Port 2E8 Interrupt 3 (COM4)
```

If you want to use a port that the /Pn switch does not support, the /Hxxx,i switch lets you specify a particular I/O port and hardware interrupt. For example, if you have a COM port at address 230h and you want it to use interrupt 5, you would enter the command BD /H230,5. Since BACKDOWN uses COM1 as the default,

CREATING AND USING A BACKDOWN SCRIPT

by Michael Holmes

Typing in the same commands every time you use a communications service is tedious and time-consuming. By using BACKDOWN's script language, you can automate such repetitive procedures. With a short script, you could log on to a BBS or set up to download a file; a longer script might handle the whole session, from when you log on through when you hang up.

The three optional command line parameters that relate to the use of BACKDOWN scripts were not explained in the main article. These are

```
BD [/Sn] [/C script] [script
  [operands]]
```

When loading initially, BACKDOWN normally reserves a 1KB buffer to hold a compiled script file and store script variables. Should you write an exceptionally long script (or one with many script variables), you may need to use the /S switch to increase the size of the script buffer to *n* bytes. For example, if you have a script that requires 1,500 bytes and you are starting BACKDOWN on COM port 2, you would enter

```
BD /P2 /S1500
```

You can write script source files with any text or word processor that produces an ASCII file. To save memory space and execution time, this file must be compiled by BACKDOWN before it can be used. To compile a script file, you enter the following command at the DOS prompt:

```
BD /C script
```

Although it is not mandatory, your ASCII script source file should normally be given the file extension .BDS. (If no extension is specified, BACKDOWN assumes this extension.) The compiled script will have the same filename but will automatically be given a .BDC extension. On completion of the compile, BACKDOWN displays

the size of the .BDC file. The number shown is the minimum number of bytes needed for the script buffer; depending on the number and length of parameters used in the script, more buffer space may be required.

Once written and compiled, a BACKDOWN script file can be executed either from the command line or by pressing F10 from the interactive dumb terminal screen. For example, to execute the TESTPARM.BDS script shown in Figure 5, passing its space-delimited parameters to it, you could enter the following command:

```
BD TESTPARM Alpha Beta Gamma
```

Note that if this command were entered when BACKDOWN was not already resident in memory, the utility would automatically be loaded and the script would be started in the background. The same script and parameters could be specified after installing BACKDOWN by pressing F10.

THE BACKDOWN SCRIPT LANGUAGE

In preparing an ASCII script source file for compilation, the BACKDOWN script language recognizes 14 commands, together with their operands. These are listed, explained, and exemplified below.

Command:

```
O [300|1200|2400|9600]
  [N81|E71|O71]
  [7BIT|8BIT]
  [B+|B-]
  [CASE|NOCASE]
```

The operands for the O (Options) command generally correspond to the settings that may be selected by pressing F2 after BACKDOWN is memory-resident. (See Figure 2.) These options include communications parameters for BACKDOWN's COM port, its display mode, and automatic recognition of CompuServe's B+ protocol. In addition, the O command can control case recognition of responses from the communications service.

In addition to the baud rates listed, BACKDOWN supports data formats of no parity, 8 data and 1 stop bit (N81); even parity, 7 data and 1 stop bit (E71); and odd parity, 7 data and 1 stop bit (O71). The 7BIT option strips the high-order bit from characters before they are displayed. With this option specified, data will display correctly if your communications parameters are none, 8,1 while those of the service are set at even or odd, 7,1. The 8BIT operand causes the display of all characters as full 8-bit values, with no masking of the most significant bit.

The B+ and B- operands respectively enable and disable the automatic recognition of the CompuServe B+ protocol. The CASE operand enables case recognition of responses to the R command (explained below); NOCASE disables case recognition. For example, if you specified NOCASE and used the command

```
R FORUM
```

any string containing the word *forum* would satisfy the wait, regardless of case.

Multiple operands, separated by a space, may appear on the same line as an O statement, and the O statement can occur more than once in the script. For example:

```
O 2400 N81 7BIT B+ NOCASE
```

Command:

```
S text
```

The S (Send string) command sends a text string to the remote computer. This command may contain embedded control characters, such as ^M (carriage return) or ^G (bell). It may also contain references to variables that will be replaced with specified character strings at execution time. (See the P command below for more about variables.) For example:

```
S DOW PCSFOO ZIP /PROTO B^M
```

CONTINUES

CREATING AND USING A BACKDOWN SCRIPT

CONTINUED

Command:

```
N text
```

The N (Notify operator) command displays a text string on BACKDOWN's screen when the TSR is popped up. The text string for this command, like that for the S command, can contain both control codes and replacement variables. For example:

```
N ^G -- Download complete --
^G^M
```

Command:

```
R text
```

The R (Wait for Remote) command waits for the data stream from a remote computer to contain a specified character string (*text*). A time-out occurs if the remote does not send the proper characters in the time specified by the T command (explained next).

The text string for the R command may contain control characters, but replaceable variables are not supported. The CASE and NOCASE option of the O command determines whether the R command is case-sensitive. For example:

```
R UserId:
```

Command:

```
T nn [label]
```

The T (Set Time-out) command sets a time-out value of *nn* seconds, to be used by the R command. The optional *label* designates a specified statement to be executed should a time-out occur. If no *label* is given, control passes to the next statement in the script. For example:

```
T 60 NotSeen
S GO ZNT:UTILFOR^M
R Forum !
```

```
:NotSeen
n Timeout waiting for Forum
prompt.^M
s bye^M
```

Command:

```
H
```

The H (Hangup) command causes the DTR line on the serial port to drop momentarily, disconnecting the machine from a remote service. For example:

```
H
```

Command:

```
D p [filename]
```

The D (Download) command invokes a specified download protocol module, *p*. The protocol letter is the same as that used in interactive mode (see Figure 3). The additional download *filename* is optional, but the Xmodem and ASCII protocols will prompt for it if one is not specified.

When the ASCII protocol is invoked, even from a script, control is returned to the keyboard. After opening the receive file, ASCII sends a carriage return to the remote service. Thereafter, characters entered at the keyboard are sent out the active COM port; received characters are both displayed and placed in the download file. Pressing the End key stops the download and returns control to the script. If 30 seconds elapse with no data received, the ASCII protocol closes the receive file and returns to the script. For example:

```
R LIB
S TYPE CDX.DOC
D A CDX.DOC
```

In the example above, note that the S command does not end with a carriage return (^M). This is because the ASCII

protocol will send a carriage return when it starts running.

If Xmodem is used, downloading begins as soon as the receive file is opened and progresses until the download is completed. To cancel receipt of a file prematurely, press the End key. The following example shows script statements to start an Xmodem download from ZiffNet.

```
R LIB
S DOW CHKFRG.ZIP /PROTO:XMODEM^M
R complete.
D X C:\DL\CHKFRG.ZIP
S ^M
```

CompuServe's B+ protocol should not be invoked with the D statement. The B+ invocation occurs automatically when the system is ready to send a file. Use the R or the W command to wait for the invocation of the CompuServe B+ protocol. For example:

```
R LIB
S DOW SLICE.ZIP /PROTO:B
W 60
```

Command:

```
P letter prompt_string
```

The P (Prompt and Reply) command displays the specified *prompt string* and loads the response into a variable designated by a single *letter* in the range from A to Z. Variables are referenced by placing a percent sign in front of the letter of each variable. For example:

```
P A Enter your name:
N ^M Your name is: %A^M
```

Command:

```
= letter [text]
```

The = (Equate) command assigns a *text* string to a script variable *letter*. When the *text* operand is omitted, BACKDOWN assigns a null string to the variable. For example:

CONTINUES

CREATING AND USING A BACKDOWN SCRIPT

CONTINUED

■ P E COPY.COM

Command:

W nn

The W (Wait) command temporarily halts execution of the script for *nn* seconds. During this period of time, any arriving characters are displayed on BACKDOWN's pop-up screen. For example:

W 25

Command:

E n

The E (Echo Control) command sets the display characteristics to *n* during script execution. These are the possible values of *n*:

- 0 stops display of all data.
- 1 displays only the data received by BACKDOWN. The host may echo any data sent from BACKDOWN.
- 2 displays only data sent by BACKDOWN. Received data is not displayed.
- 3 displays data sent from and received by BACKDOWN. This may result in characters appearing twice on the screen.

If no E command is specified, the value defaults to 1. For example:

■ 3

Command:

G label

The G (Goto) command transfers control to the point in the script at which *label* is found. The transfer is an unconditional forward or backward jump. For example:

G GetLaser1st

Command:

:label

The *:label* command marks a particular point in a script as the target for a G or a T command. For example:

```
:GetLaser1st
S DOW LASERL.ZIP /PROTO:B
W 15
```

Command:

; comment

You can include documentation in your scripts by using comment statements. A comment statement contains a semicolon as the first character on the line. Any text appearing after the semicolon is ignored by the compiler. ■

the following three commands to load the program into memory are functionally identical:

```
BD
BD /P1
BD /H3F8,4
```

When you have finished using BACKDOWN, you can remove it from memory by typing the command BD/U. Note that

if you try to uninstall BACKDOWN as it is processing a download or script, it will ask you if you are sure you want to uninstall it. If you answer yes and the BD/U command is successful, you will get a message indicating that BACKDOWN has been uninstalled. The only time the /U command will not work is if you loaded another program after BACKDOWN. In this case, simply uninstall that program first.

You can test whether BACKDOWN is actively engaged by using the /T command line switch. This switch returns an ERRORLEVEL and a screen message that indicates whether BACKDOWN is installed, and if so, whether or not it is busy. Specifically,

- ERRORLEVEL 2 indicates that BACKDOWN is not installed.
- ERRORLEVEL 1 indicates that BACKDOWN is installed, but it is either running a script or receiving a download.
- ERRORLEVEL 0 indicates that BACKDOWN is installed but is in its "dumb terminal" mode and may therefore be uninstalled.

As an example of the /T and /U switches in action, the following batch file will repeatedly test for activity until BACKDOWN is through processing and then it will unload the program.

```
@echo off
:testbd
BD /T >NUL
IF ERRORLEVEL 2 GOTO NOTHERE
IF ERRORLEVEL 1 GOTO TESTED
BD /U >NUL
Echo Backdown now uninstalled!
```



Figure 1: The initial "dumb terminal" screen is displayed when BACKDOWN is popped up or when F1 is pressed.

Now You Can Get The Answers To Software Questions When You Need Them!



Support On Site™



THERE HAS NEVER BEEN SUPPORT LIKE THIS

The most comprehensive and complete source of technical support information — on all the leading PC software applications — is now available on a single CD-ROM.

It's called Support On Site. To make absolutely certain that Support On Site is

always the latest and most complete source of support information anywhere, it comes as a monthly subscription. Every month a new, complete and updated compact disc is delivered directly to you. As fast as information or applications change — you've got the answers.

SUPPORT FOR MAJOR APPLICATIONS

Aldus	Symphony®
Aldus® PageMaker®	Freelance Graphics™
Borland	Freelance Graphics™
dBase®	for Windows™
Quattro® Pro	Ami Pro™
PARADOX®	Microsoft
MultiMate	MS-DOS®
Lotus	Microsoft®
Lotus® 1-2-3®	Windows™
Lotus® 1-2-3® for	Microsoft® Excel®
Windows™	Microsoft® Word®

Word® for Windows™	Symantec
Microsoft® Works®	Q&A™
Microsoft® Works®	WordPerfect
for Windows™	WordPerfect®
PowerPoint®	WordPerfect®
Quarterdeck	for Windows™
DESQview™	WordStar
QEMM™	WordStar®

And — don't forget — since Support On Site is issued every month, this list will be constantly expanded and updated.

WHAT CAN IT DO FOR YOU?

Support On Site helps you solve software problems quickly and simply. It answers questions — on a single application or on many. It saves time. Boosts computer productivity throughout an organization. Improves PC user service. Expands support staff capabilities. And helps control costs. And that's just a few of the things Support On Site can do. You'll find hundreds of ways that it can make you more efficient and smarter.

RIGHT AT YOUR DESK

One of the most amazing aspects of Support On Site is that it puts — on one small disc — hundreds of functions and services that were outside your organization or business, and outside of your control, inside. In fact, it puts them on site — right at your support desk. You no longer have to depend on outside sources — whether in bulletin boards or by phone — to solve software problems. The answers are always at hand, when and where you need them. For the first time, support professionals have direct access to the information they need. That means less time is lost looking for answers, and more effort can be concentrated on the real job — solving users' problems.

EASY ACCESS

Support On Site combines extensive technical and operational software information — much of it not widely available — in one quick, search-and-retrieve program. Nothing could be easier. And no special training is needed. All you have to do is type the

words or phrases that describe your problem, and the entire database is quickly searched. The information you need appears in front of you on the screen.

FAST ANSWERS

No more hunting through manuals, sitting "on hold" waiting for 800# operators, calling up "friends" to see if they have an answer, searching bulletin boards or paying expensive computer consultants to fix simple problems. You get the answers you need in seconds.

WHERE DOES ALL THE INFORMATION COME FROM?

Everywhere. Support On Site puts software publishers' manuals and technical notes, as well as information from Cobb Newsletters, reference books by Que and Ziff-Davis Press and tech notes from industry sources on your desktop. It is the most comprehensive, single source of technical support information on the leading PC software applications available anywhere.

QUICK!

Can you answer
these software questions?

1. Should you run FASTOPEN AND SMARTDRV concurrently?
2. How should you configure DESQview 386 to run with Lotus 1-2-3?
3. What causes a "Cannot load COMMAND.COM" message in DOS 5.0?
4. What does "Internal Stack Overflow" mean when WordPerfect 5.1 is running?
5. How do you save a Quattro Pro spreadsheet in the dBase format?

With Support On Site
you can answer these questions
— and thousands like them —
in seconds.

SPECIAL EXTRAS

Support On Site includes proprietary software — drivers, patches, bug fixes and macros — that come from software publishers' own support desks. They are accessible in seconds.

WHO NEEDS IT?

Everyone — sooner or later — has problems with software. But the ones who can benefit most from Support On Site are the people who are paid to solve those problems:

- HELP Desks
- End-User Computing Professionals
- Information Center Personnel
- MIS/DP
- Computer Resellers
- Independent Support Companies
- PC Vendors

Anyone who answers questions about software applications will find that they can do their job better — more expediently and cost effectively — with Support On Site.

CALL NOW FOR FREE DEMO DISK

Find out exactly how quick, easy and comprehensive Support On Site is — call today for a FREE demonstration disk. No obligation. No commitment. But lots of information.

SUPPORT ON SITE AT-A-GLANCE

- Only database of support materials from ALL the leading PC software publishers
- Covers ALL the leading word processors, spreadsheets, databases and more as well as MS-DOS and Microsoft Windows
- All on one CD, updated monthly
- Much of the information available nowhere else
- Over 55,000 documents — and growing!
- Searchable in seconds
- Directly from the publishers — the latest drivers, macros, and more

1-800-827-7889 ext. 312

CIRCLE 009 ON READER SERVICE CARD

☐ **YES!** I want the answers to PC software questions — right at my fingertips — in seconds! Please send me a FREE Support On Site demonstration disk so I can see for myself how quick, easy and comprehensive this revolutionary new system is.

Please choose one: ☐ 3 1/2" ☐ 5 1/4"

NAME

ADDRESS

CITY STATE ZIP

TITLE

COMPANY

TYPE OF BUSINESS

PHONE

MAIL TO:
Support On Site
Ziff Communications Company
One Park Avenue, 5th Floor • New York, NY 10016

LIBRARY
PC MAG ABA2



FAST ANSWERS TO SOFTWARE QUESTIONS



Figure 2: After pressing the Settings key (F2), you select each of the desired communications parameters with a single keystroke.

```
GOTO END
:NOTHERE
Echo BACKDOWN not in memory!
:END
```

When you load BACKDOWN into memory, it looks for any download protocol modules you may have on your system. These modules each have a .BDP extension (for BackDown Protocol). BACKDOWN looks for these modules in either the directory specified by the environment variable BDP or in the current directory.

You can create the BDP environment variable with the DOS SET command. For example, if you have stored the protocol modules in your C:\PCMAG\BACKDOWN directory, you can relay this information to BACKDOWN by using the command

```
SET BDP=C:\PCMAG\BACKDOWN
```

either from the DOS prompt or, more conveniently, as a line in your AUTOEXEC.BAT file.

When loading, if BACKDOWN determines that it is already loaded or that the COM port specified is not in your system, it displays the appropriate error message and returns to the DOS prompt. Otherwise, BACKDOWN displays the names of the available protocol modules and finishes with a message indicating that it has loaded. Until you issue the BD /U command to unload it, BACKDOWN will remain memory-resident.

Once BACKDOWN is resident in memory, you pop it up by pressing the key combination Ctrl-Alt-B. The current screen is saved and replaced with the initial

“dumb terminal” screen shown in Figure 1. This screen doubles as a noncontextual help screen that can be accessed by pressing F1. The use of the various other function keys shown in the figure will be explained shortly. To return to DOS or to your application (keeping BACKDOWN active if it is downloading a file), the hotkey is Alt-X.

When you are using the “dumb terminal” interface, any information you enter will be sent out over the specified COM port. You can verify this by typing a few random letters at the keyboard and noting that the SD (Send Data) light on your modem flickers. Similarly, any characters received will be displayed. If you’re using a Hayes-compatible modem (as we’ll assume for all examples in this article), entering the command ATV1E1 will set the modem for Verbose Responses (V1) (such as OK or NO CARRIER) and Echo

On (E1), so you can see what you type. After typing the command, hit the Enter key and the modem should respond “OK”.

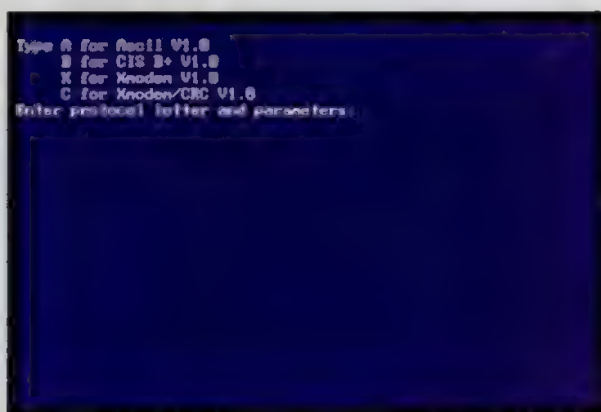
At this point, you can proceed along one of several paths. You can change BACKDOWN’s settings by pressing F2. As we have just illustrated, you can type specific modem commands to connect to or use a communications service simply by typing them on the dumb terminal screen and hitting Enter. By hitting F9, you can initiate a download. You can execute a script that will perform one or more predetermined functions by hitting F10. Or you can pop down the TSR and return to your application or to the DOS prompt by pressing Alt-X.

SELECTING SETTINGS

As shown in Figure 2, when you press the Settings key (F2), BACKDOWN displays a four-column list of the various communications parameters you can set with BACKDOWN. The first column shows the available baud rates, and the second indicates the available data bits, parity, and stop bit combinations. The third column lets you choose how many bits will be used when characters are displayed on your screen. If you select 7BIT mode (the default), the high-order bit of incoming data will be stripped off before being shown. The fourth column selection determines whether automatic CompuServe B+ protocol invocation is enabled or disabled; this will be explained below.

To make a selection from the options shown, simply press the character that corresponds to it. BACKDOWN will display the setting you selected and will prompt you for another entry. Hitting Enter returns you to the dumb terminal mode.

Figure 3: Pressing the Download key (F9) begins the download process with your choice of protocols.



After setting BACKDOWN's parameters, you can enter the necessary modem commands. For example, if your local ZiffNet access number were 555-1235, you would type

```
ATDT555-1235
```

and then hit the Enter key. The modem would dial ZiffNet and respond with some version of the Connect message.

DOWNLOADING FILES

Any time you want to download a file or capture information, you must use a *protocol*. A protocol consists of a set of rules that allows two computers to talk to each other; both computers must abide by the

agreed upon protocol during the transfer of files. Protocol agreement is established by a process known as *handshaking*, which takes place when the two computers first connect.

Four protocols come with the initial distribution of BACKDOWN: Xmodem, Xmodem/CRC, CompuServe B+, and ASCII. Among these, Xmodem, Xmodem/CRC, and CompuServe B+ provide correction facilities to ensure error-free file transmission. The ASCII protocol allows any information displayed during the session to be captured to a disk file, but because it lacks error-correction facilities, it provides no assurance that the

data is transferred reliably.

Which protocol should you use? If you are just trying to capture information that is being displayed on the dumb terminal screen, use the ASCII protocol. It is the only protocol that performs this function.

For file transfer via ZiffNet or CompuServe, CompuServe B+ is the protocol of choice. In the absence of CompuServe B+, Xmodem/CRC is the next best, followed by Xmodem. Xmodem and Xmodem/CRC are implemented with "relaxed" Xmodem timing (where the timing requirements are not as stringent), so that they work properly with ZiffNet or CompuServe. Both Xmodem and Xmodem/CRC use the same basic BXMODM.BDP module.

Systems vary in the exact sequence of events that leads up to a file download, but the usual scenario runs something like this: Select the file to download, tell the remote system which protocol you want to use, wait for the remote system to tell you to start it at your end, and execute the protocol on your machine. From there, the two computers enjoy a friendly conversation while transferring the file you requested. On completion of the transfer, you are usually returned to some type of command prompt.

To see how BACKDOWN implements this procedure, let's assume that you want to retrieve the latest copy of CDX.COM from ZiffNet.

First, from the BACKDOWN dumb terminal screen you connect to ZiffNet by giving your modem the AT commands to dial your local ZiffNet access number. When you see the Connect message, you press Ctrl-C. The system then prompts you for your user ID and password. After you enter these, several initial messages will be displayed.

Eventually, you'll get to a prompt (usually an exclamation point), at which you type

```
GO ZNT:UTILFOR
```

and hit Enter. This will take you to the Utilities/Tips Forum, where you will enter the command LIB 2. (All of the PC Magazine utilities are kept in Library 2.)

For this example, we will download CDX.COM using the Xmodem/CRC protocol. Type the command

```
DOW CDX.COM /PROTO:XMODEM
```

and press the Enter key. ZiffNet will respond by giving you some information

BACKDOWN MESSAGES

by Bob Flanders

When two computers have to communicate across telephone lines, occasional errors are bound to occur. When this happens, BACKDOWN will notify you, either on the screen directly (if you're working interactively) or by popping up over your application. Many of the messages the program sends depend on the specific protocol you have selected, so they are listed by protocol and followed by brief explanations.

```
XMODEM: Timeout, protocol ended
B+: Timeout, protocol ended
ASCII: No Characters seen for
30 seconds, protocol ended
```

The download is cancelled when the message above is displayed.

```
XMODEM: Too many errors, download
cancelled
B+: Too many errors
```

As a transfer proceeds, BACKDOWN is constantly checking for errors. If too many errors occur in a row, the download is cancelled.

```
B+: Receiving filename
```

The message showing the name of the file being received is displayed when a transfer begins with the CompuServe B+ protocol.

```
XMODEM: User cancelled download
B+: Download cancelled
```

If you press the End key during a transfer, BACKDOWN will display this message and attempt to end the transfer gracefully.

```
XMODEM: Sender cancelled
download
```

If the service you are using stops the download, BACKDOWN tells you about it with this message.

```
XMODEM: Write error. Protocol
aborted
B+: Aborted: write error
```

This error occurs if BACKDOWN is unable to write data to the file you have specified, as may happen, for example, if the disk fills up.

```
XMODEM: Packet sequence error
```

This is an unusual error in Xmodem where a piece of the file being transferred has been irrecoverably lost, so the transfer is cancelled.

```
XMODEM: Download completed OK
B+: Download completed OK
```

This message appears after a successful download. ■

about the file and will then ask you to start the protocol. This means that ZiffNet is ready to send the file.

Now you finally get to press the BACKDOWN Download key (F9), which will bring up the screen shown in Figure 3. From that screen, you select Xmodem/CRC by typing a C, followed by Enter. You will then be prompted for a filename, which you must enter and which (optionally) may include a full path. In this case you type CDX.COM and press Enter.

BACKDOWN tells ZiffNet that it is ready to receive the file, and the transfer begins. After a few minutes (depending on the speed of your modem), the file CDX.COM will be on your hard disk and BACKDOWN will tell you that the transfer has been successful. ZiffNet requires you to press the Enter key to get back to the LIB prompt. Entering the command BYE will then disconnect you from ZiffNet.

When using the Xmodem and ASCII protocols, you may enter the filename to be received when you specify the protocol. In the above example, when asked for a protocol, you could have entered

```
C CDX.COM
```

and BACKDOWN would not have prompted you again for the filename.

If you are using the CompuServe B+ protocol, the above procedure must be altered slightly. First, when ZiffNet displays the LIB prompt, you respond

```
DOW CDX.COM /PROTO:B
```

Next, instead of prompting you to start the protocol on your machine, ZiffNet requests that you enter a filename for your computer. The filename you enter is used to store the information when it is placed on your local disk. After typing the filename, ZiffNet sends a message to BACKDOWN requesting that it start a B+ transfer.

This is where your setup choice of B+ Enabled or B+ Disabled comes in. If you do not have B+ enabled, the request will be ignored and a "club" character (ASCII 5) will be displayed on your screen. If B+ is enabled, however, BACKDOWN will automatically load the protocol module and tell ZiffNet that it is ready to receive. From here on, the transfer is similar to the Xmodem transfer.

Why would you ever want to disable

PROGRAMMING UTILITIES

ZN BDS

COMPLETE LISTING

PC MAGNET

```
; Dial up ziffnet and log in.
O 2400 8N1 7BIT B+ NOCASE

; Init the modem
T 5 ReInit

:Init
S ATZ^M
W 3
S ATE0V1^M
R OK
G Dial

; Only reaches here if first init fails
:ReInit
T 5 FailInit
G Init

; Die gracefully if modem does not respond
:FailInit
N Modem did not respond^M
G End

; Dial ZiffNet
:Dial
N ^MDialing ..
T 60 NoAnswer
W 1
S ATDT9,555-1234^M
R CONNECT
W 1
N ^MConnected^m
W 1

; Send userid

S ^C
R Userid:
S 77777,8888^M

; Send Password

R Password:
S Your:Password:Here^M

N ^M^G --- Login Complete --- ^G^M
G End

; NoAnswer - Hangup and tell operator
H
N ^G -- Line busy or your modem isn't working -- ^G^M

: End
```

Figure 4: After you compile it under BACKDOWN, this sample script will log you onto ZiffNet. Note that the user ID and password shown must be replaced with your own.

automatic B+ detection? You would do so if you were connecting to a service that does not use B+ and that needs to send you a "club" character (known as an ENQ). In such a case, disabling CompuServe B+ recognition will prevent BACKDOWN from sending a response that is not used by the service.

The example above describes a perfect file transfer, but life is not always perfect, nor are file transfers. The error messages that BACKDOWN may display during a download are included in

the sidebar "BACKDOWN Messages."

The ASCII protocol, unlike the others, captures text just as it is displayed on the dumb terminal screen. It also lets you enter keystrokes as if no protocol were running. One noticeable difference is that none of the function keys work while the ASCII protocol is active.

To cancel any protocol before completion of a file download, you just press the End key. In response, the ASCII protocol simply closes the receive file, whereas the Xmodem and CompuServe B+ proto-

TESTPARM.BDS

COMPLETE LISTING

If you have the following script called TESTPARM:

```
N Parm 1 is %1^M
N Parm 2 is %2^M
N Parm 3 is %3^M
```

Here is a sample execution:

Script name: TESTPARM Alpha Beta Gamma

```
Parm 1 is Alpha
Parm 2 is Beta
Parm 3 is Gamma
```

Figure 5: This short script demonstrates how command line parameters are specified. Much like a batch file's parameters, they are referenced as %1, %2, and so on.

cols attempt to abort the transfer gracefully before returning to the dumb terminal or script.

Remember, while using BACKDOWN to download a file, you may return to your foreground program at any time except when you are answering a question that BACKDOWN has displayed for you to answer. You return to the foreground program by pressing Alt-X.

One final note on downloads: If you initiated the download from the dumb terminal (as opposed to a script) and you have exited BACKDOWN and returned to the foreground, BACKDOWN will automatically pop up when the download is complete.

ADDITIONAL FUNCTIONS

There are three other function keys that perform important tasks. The first is the F4 key, which causes BACKDOWN to send a single 0.5-second break signal. The string <<BREAK>> on-screen tells you that the signal has been sent. The need for and use of the break function varies from service to service, but whenever you need it, you've got it.

When you want to disconnect from a service, pressing the F3 key momentarily drops the voltage of the Data Terminal Ready (DTR) signal to the modem and displays the string <<HANGUP>>. If your modem is configured to honor DTR, it should disconnect immediately.

If your modem is not configured that way, you may have to type something like +++ATH and hit Enter. The +++ usually causes a Hayes modem to return to the command state; the ATH command tells the modem to hang up.

Generally, you should log out of a remote service before disconnecting with

F3. Logging out is the best way to be sure that the service knows you have completed your session. This can avoid anything from a minor annoyance to additional charges for connect time. In many cases, the remote service breaks the connection automatically as the result of a logout command.

Finally, the F10 key allows you to enter the name of a BACKDOWN script to be executed. Scripts free you from regularly retyping commands that perform everyday tasks, such as dialing a number, logging you into a service, or retrieving files. A sample script for logging onto ZiffNet is shown in Figure 4, but it must be compiled before BACKDOWN can run it. After pressing F10 you can enter not only the script name but also up to nine blank delimited operands after that name. Figure 5 provides an example of how such parameters are used, but for a full discussion of BACKDOWN's script language and procedures, you should turn to the sidebar "Creating and Using a BACKDOWN Script."

There are several things that BACKDOWN does not do. For instance, it has no upload capability. Nor does it provide any terminal emulation beyond a basic teletype-style interface. Furthermore, its script language is more limited than we would like it to be.

Even with the absence of these features, however, we hope you are among the many *PC Magazine* readers who will not only use BACKDOWN but will wonder how they ever got along without it. ■

Bob Flanders is president and senior systems analyst and Michael Holmes is vice president and senior systems analyst at NCI Systems in Annandale, Virginia.

She's 5 years old.
She's already had
7 names,
16 identities and
21 homes.



Ad
Council

Every year thousands of children are kidnapped by their own parents. Beginning the tragic ordeal of life on the run. Child Find offers an end to the running. With our toll-free number and our mediation program, we offer a way out for the parents and for the kids.

For us, it's a labor of love. But unfortunately, we can't operate on love alone.

To find out how you can help, or if you need our help, please call 1-800-A-WAY-OUT. And help another child find a more peaceful future.



CHILD FIND OF AMERICA INC.

by
Douglas Boling

Lab Notes

The serial and parallel ports through which your computer sends and receives data have evolved considerably since the early days of the IBM PC. Essentially, their roles remain unchanged. Parallel ports, which are easy to implement, continue to be the choice for high-speed data transfer over short distances. Serial ports, while more complex, provide communication over longer distances, especially when combined with an attached modem. New to many of today's serial and parallel ports, however, are such sophisticated features as embedded RAM queues and built-in direct memory access (DMA).

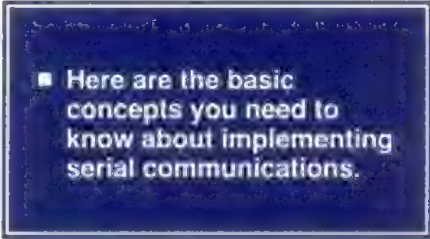
To put these developments in their proper context, I'll begin by reviewing basic serial communications concepts before turning to their specific implementations in today's PCs in the next issue. Then, in a future Lab Notes, I'll discuss parallel-port developments.

GENERIC SERIAL COMMUNICATIONS

In its simplest form, data is transferred from sender to receiver one bit at a time through a single line or circuit. You can send any sequence of bits simply by setting the line to a specified voltage for a specified length of time for each successive bit. The port at the receiving end samples the voltage on the line at the predetermined intervals in order to read the bits. In theory, all that is needed is agreement between sender and receiver on the transmission rate and on the voltages that will represent the ON and OFF states of each bit. In practice, the challenge facing serial communications is that of maintaining coordination between the bits being sent and those being read.

To see how problems can arise, let's consider a hypothetical example in which two serial ports are connected, either directly or through a pair of modems. We'll assume that it had been agreed that the transmitting computer will send data to the receiving computer at the rate of one bit per second. For a 0 bit, the sender will set the line at the lower of two defined

Putting Serial-Port Technology in Perspective, Part 1



■ Here are the basic concepts you need to know about implementing serial communications.

voltages for a period of 1 second. If the next bit is a 1, the sender will then raise the voltage on the line to the higher specified level for the next second.

The receiver in this example reads the bits by checking the voltage on the data line at successive intervals of 1 second. Suppose, however, that the receiver's clock happens to run slightly faster than the clock in the transmitting computer. In this case, the receiver will start checking the line earlier and earlier during the period when the data bit is on the line. Sooner or later, the receiver will sample the same bit twice, and thereafter the data received will be out of sync with the data sent.

One way to solve the synchronization problem is to tell the receiving computer precisely when it should sample the data line. This can be accomplished by means of a second line, called a clock line. After placing the data bit on the serial data line, the transmitting computer sends the receiving computer a signal on the clock line saying, in effect, "Read the data bit now." Since the transmitting clock dictates both the send and read rates, no synchronization problem can arise.

The method of providing a clock signal on one line while the data is on another line is called synchronous serial

communication, and this aspect of the setup used is diagrammed in Figure 1. Synchronous communication has a number of advantages. First, the data transmission itself is highly efficient, since every bit on the data line can represent a bit of data. Second, since the clock signal originates with the device transmitting the data, the transmission speed can be changed simply by adjusting the rate of the clock line and data line at the same time. The big disadvantage of synchronous serial communication, of course, is that it requires the extra clock line, doubling the number of lines needed to transmit the data.

An alternative way to synchronize serial ports is to encode clocking information into the format of the data being transmitted. This method, used for most PC-based serial equipment connections, is called asynchronous serial communication. Under this arrangement, the transmitter and receiver are set to the same nominal speed, and no extra clock line is provided. Transmission errors that would inevitably arise over the long term because of slight differences in nominal speed are precluded by having the receiver use the clocking information to synchronize itself to the transmitter each time the group of bits that constitutes a data word is read.

The encoded clocking information consists of a start bit and a stop bit. When the asynchronous serial link is not passing data, the data line is held in a known state, usually that of a logical 1. Having no data to send, the transmitter simply marks time by sending *marking bits*. To notify the receiving device that a data

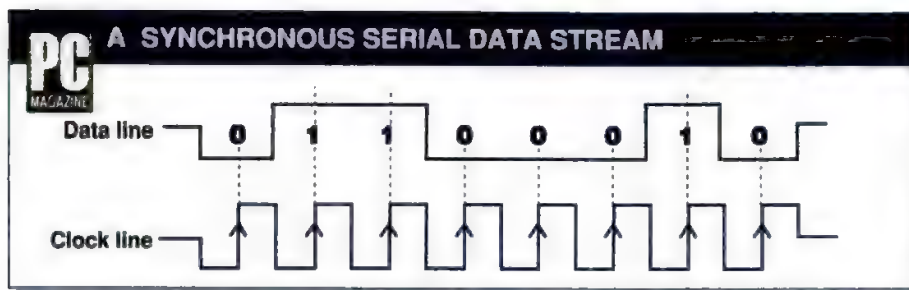


Figure 1: In synchronous serial communication, a clock signal is on one line while the data is on another line. While this is highly efficient, it does require two lines.

word is about to be sent, the transmitter sends a *start bit*, whose state is opposite to that of the marking bits. The data word, usually 7 or 8 bits, is sent immediately after the start bit.

The receiver detects the change from the stream of marking bits to the start bit and synchronizes its checking of the data line with the start bit. The data word is then read. At the end of the data word, a *stop bit* is appended to the data. The stop bit has the same state as the marking bits; that is, its state is opposite that of the start bit. If the transmitter has another data word to send, it sends another start bit after the stop bit, thus indicating the beginning of the next word. Figure 2 shows an async serial data stream. The important point to note is that the receiver synchronizes with the transmitter each time a start bit is received. Even if the clock in the receiver is faster or slower than the transmitter, as long as the difference is not significant over the length of time it takes to send one data word, the difference in speed doesn't matter.

ADDING MODEMS

Although a direct cable connection between two computers' serial ports or between a computer and a serially driven printer is not unusual, most serial communications take place through a pair of modems, which can be connected directly to telephone lines. Instead of representing 0s and 1s by simple voltages, a modem converts them into *modulations* of an audio frequency at the sending end. These waveforms are *demodulated* and reconverted to digital form by the receiving modem. By using sophisticated modulation techniques, modems can send multiple bit patterns with each change in the line state. Such techniques make high-speed modems possible, but because of them a certain amount of confusion

in the terminology has arisen.

The transmission speed of serial links can be expressed in terms of either baud rate or bits per second. While often carelessly spoken of as if they were the same, these two measurements are quite different. Bits per second is exactly that: the number of bits transmitted every second. *Baud rate*, on the other hand, is a measure of the number of changes in the state of the line per second. In a purely digital link, in which the data line state can directly represent only a 1 or a 0, the two rates are the same, for only one bit is transmitted with each change in the line. Because modems transmit data by means of tones that can each represent more than one bit of data, however, the baud rate of a modem can be much lower than the transmission speed measured in bits per second.

Adding modems to the serial communications system increases the complexity of the necessary interface wiring and introduces the need to detect and rectify transmission errors introduced by weak or noisy lines. One commonly used form of error checking is implemented in the data format by adding a parity bit after the data bits but before the stop bit.

Parity checking involves counting the

total number of 1 bits in each data word and its parity bit. When even parity is used, the parity bit is set to 1 or 0 to make the total an even number. For example, if the data word sent was 00111010, the parity bit would be set to 0 for even parity, as there are four 1 bits in the data word. For an odd system parity, the bit is set to make the total odd. The receiving serial port also counts the 1 bits in each incoming data word plus its parity bit. If the number does not match the parity mode, then there was an error in transmission and at least one of the received bits is wrong. Note, however, that simple parity checking is by no means foolproof: If an even number of bits are changed during transmission, the error will not be detected.

Another use for the parity bit is *sticky parity*. The term is something of a misnomer, for in this mode the parity bit is not used for parity checking at all. Rather, it is always set to a known state, either 0 or 1. When sticky parity is used, the receiver will always see a known bit at the same point in each data word.

The basic disadvantage of asynchronous communication is that extra bits are added for each data word sent by the transmitter. Adding one start and one stop bit means that ten bits must be sent for every eight bits of data, reducing the effective data rate by 20 percent. The rate is reduced still further if a parity bit is added to the data word. Since most common serial transmission modes use about ten bits per byte, you can roughly translate bps to bytes per second (at maximum efficiency) by just dropping a zero.

THE RS-232 SPECIFICATION

The Recommended Standard 232 takes the general concepts of serial communications and fleshes them out with the necessary specifics. The standard defines

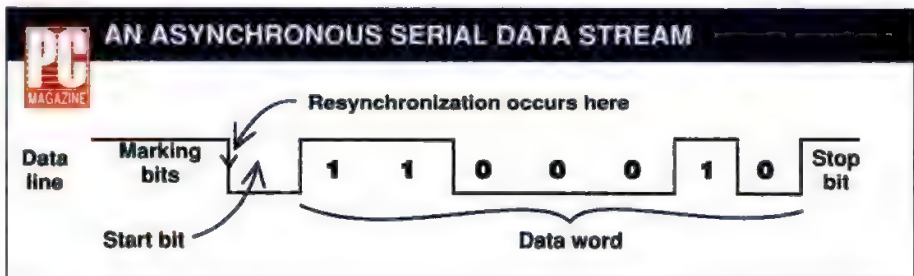


Figure 2: This is an alternative to synchronous communication. An async link encodes the clocking information into the format of the data being transmitted. Note that the receiver synchronizes with the transmitter each time a start bit is received, on the edge between the marking bits and the start bit.

exactly what the voltages shall be for ON and OFF bits, which pins on what kinds of connectors are to be used to join serial equipment together, and precisely how the transmitting and receiving units will recognize each other as ready to handle data, to name a few examples.

RS-232 was originally adopted by the Electronics Industry Association (EIA) in 1960 to codify the procedures by which terminals would communicate with mo-

dem. The standard has evolved over the years, with the third revision, RS-232C, being set forth in 1969. Serial ports on the PC are designed to the RS-232C specification. In 1987 the standard was again revised to RS-232D, also known as EIA-232D. The changes made in the D revision extend the specification to define three additional test lines and the shape

of the connector. Electrically, the connector recommended by RS-232D emulates the standard 25-pin connector used by PCs.

According to RS-232, the terminal (or these days the computer) is known as the data terminal equipment (DTE), and the modem connected to it is known as the data communication equipment (DCE). The standard specifies higher electrical levels to represent logical 0s and 1s than the 0- to 5-volt TTL levels used inside PCs. This ensures that the bits can be read at the end of the maximum cable length (which is also specified by the standard) between the DTE and DCE. Note that since RS-232 defines only two states, 0 and 1, the baud rate of a serial port is conveniently the same as the bits per second transmitted.

Because the cables between the serial port on the computer and the modem are relatively short, it is practical to use physically separate wires ("lines") in an RS-232 cable to handle control signals that must be encoded for modem-to-modem transmission over a telephone line wire pair. RS-232 specifies all the connections needed between the DTE and DCE to implement both synchronous and asynchronous communication. Since the serial ports on most PCs are strictly asynchronous, I'll discuss only those lines needed for asynchronous communication.

The asynchronous portion of the RS-232 spec requires two lines for data transmission, six lines to pass control information, and a signal ground. These nine lines, with their conventional abbreviations, are:

- transmitted data (BA);
- received data (BB);
- request to send (RTS);
- clear to send (CTS);
- data set ready (DSR);
- data terminal ready (DTR);
- ring indicator (RI);
- data carrier detect (DCD);
- signal ground (AB).

The signal ground provides a reference point for the levels of the other signals. Figure 3 shows the proper pin assignments for both 25-pin and 9-pin serial port connectors.

Initiating a conversation between the computer (or terminal) and the modem is a process that consists of sending signals across the various control lines until both the modem and the computer are satisfied that each is ready to communicate. This *handshaking*, as it is called, ensures that

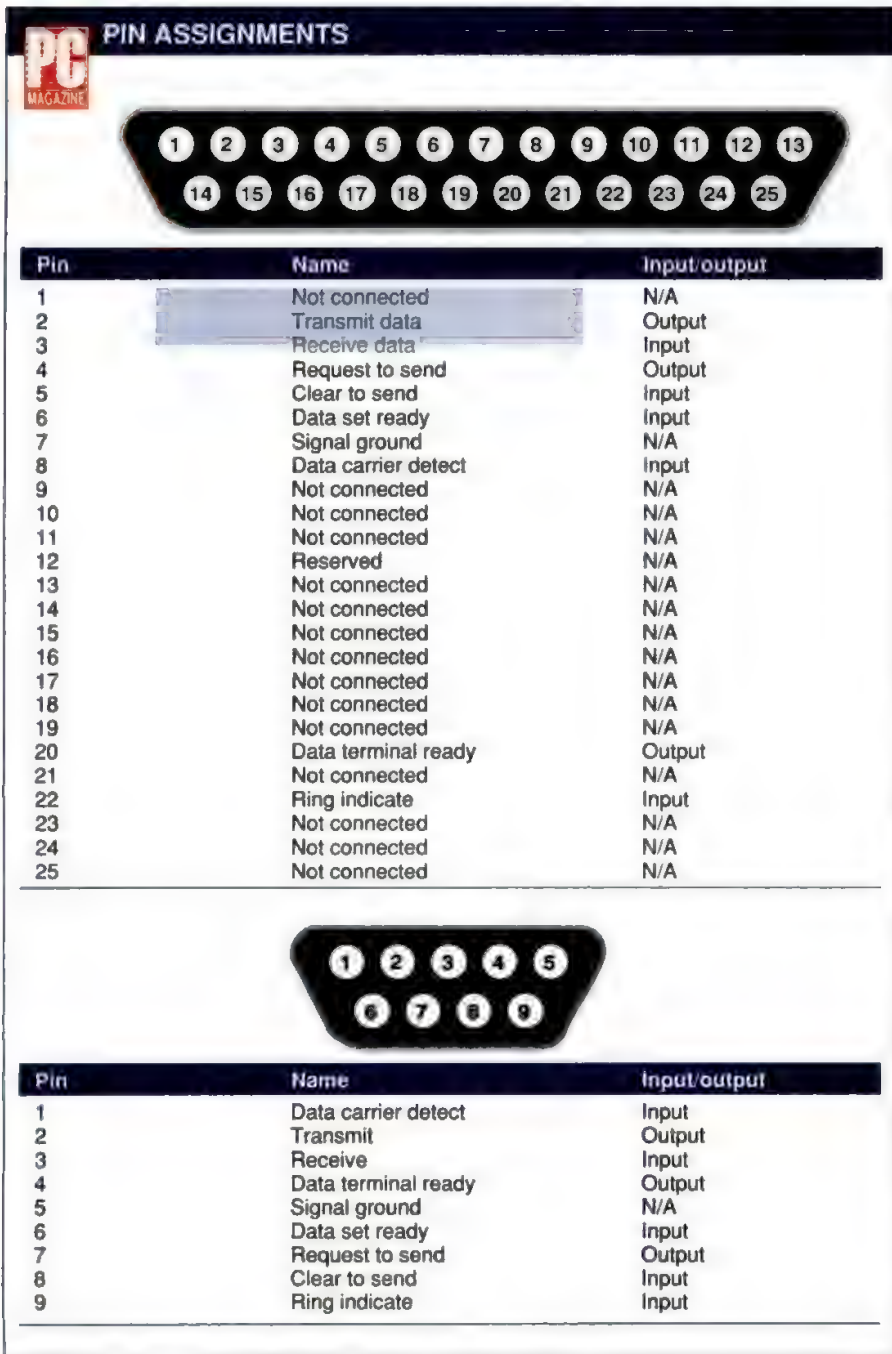


Figure 3: This diagram shows the proper pin assignments for both the 25-pin and 9-pin serial port connectors.

both devices are ready when data transmission starts.

Specifically, when the computer (the DTE) wishes to initialize the link to the modem (the DCE), it sends the lower of the two predetermined voltages on its DTR line, indicating that it is able to start a conversation. The modem responds by sending the lower of the two voltages across its DSR line, indicating that it is able to receive. Usually, these lines are set to a lower voltage when the computer and modem are turned on.

When both units signal "ready," the computer sends the lower of the two predetermined voltages on its Request to Send (RTS) line. In the old days, the sending modem would then blindly place a carrier signal on the phone line. When it detected the carrier signal, the receiving modem would put the higher of the two predetermined voltages on its DCD and CTS lines.

Today, with intelligent modems such as the Hayes Smartmodem, a conversation can take place between the computer and modem. In this case, the DCD line is not raised with the CTS line. It is raised only after the modem has dialed a num-

ber and detected the proper carrier tone from the receiving modem. The last control line is a ring indicator line, which notifies the computer when another modem is calling its modem. Once all this handshaking has been completed, the data can be transmitted from the sending computer to its modem, then through the phone lines, and finally from the receiving modem to its computer.

One often confusing point about the RS-232 specification arises from the critical distinction it draws between the DTE (computer) and the DCE (modem). RS-232 specifies that lines are connected to the same pin number at each end of the cable. That is, pin 2 on the DTE connector is connected to pin 2 of the DCE connector, DTE pin 3 runs to DCE pin 3, and so on. Pin 2 is designated as the Transmit Data Line. Pin 3 is designated as the Receive Data Line. The designations *transmit* and *receive* are always referred to from the perspective of the DTE (the PC). The computer transmits data to the modem on the transmit line, pin 2, and receives data on the receive data line,

pin 3. The modem or any other DCE must therefore transmit data on pin 3, the receive data line, and receive data on the transmit data line, pin 2.

If a serial connection is to be made between two computers configured as DTEs, a *null modem* must be used to ensure that both devices are transmitting and receiving on the proper lines. A null modem—an adapter or a cable—swaps the appropriate lines between the two computers to allow data transmission as well as the proper handshaking.

INSIDE THE PC

The PC BIOS itself provides a serial-port interface, using interrupt 14h. The BIOS functions allow setting the baud rate and the configuration of the data word. The status of the serial port can also be read, and data can also be sent and received. Unfortunately, the limited support provided in the BIOS has forced programmers to bypass its services and write directly to the serial-port hardware or UART, which I will discuss next time. ■

Douglas Boling is a contributing editor to PC Magazine.

It's Automatic and Easy

SmartPrint makes it easy for several computers to share the same printer automatically. Simply plug your computers and printer into SmartPrint. Then send work to the printer exactly as before.

Printer Busy? No Problem!

If the printer is busy, SmartPrint's software saves your print data on your hard disk and sends the data when the printer is available.

It's all automatic. You continue your work as usual. And compared to printer sharing devices that use expensive yet limited RAM buffers, SmartPrint is half the cost.

All SmartPrint products are made in the USA and carry a full three year warranty. SmartPrint is distributed to dealers through Ingram Micro and can be found or ordered at most computer stores. Call for the store nearest you.

Advanced Printer Sharing at Half the Cost.

Safe for All Systems

SmartPrint uses Hewlett-Packard approved electronic switching. Our advanced circuitry even enables you to use long cables (up to 50' parallel, 1000' serial).

Call

1-800-368-7737

We'll answer any questions and FAX or mail you complete information immediately.



Dresselhaus

COMPUTER PRODUCTS
8560 Vineyard Ave, Bldg 405
Rancho Cucamonga, CA 91730
(714) 945-5600 FAX: (714) 989-2436

SmartPrint at a Smart Price

2 Computers - \$129
4 Computers - \$199
6 Computers - \$229

SmartPrint
Printer Sharing System™

by
Charles Petzold

Environments

A strong, regular drumbeat is the crucial rhythmic foundation of much of American popular music. Under the influence of African-American culture, jazz, rhythm and blues, and rock 'n' roll have all been built around the driving pulse of percussion.

Drummers are often highly regarded for their rhythmic accuracy and precision, and it is not uncomplimentary to say that a drummer "plays like a machine." Although electronic drum machines can't capture the improvised variations that make good drumming so enjoyable, a drum machine can still be a reasonable compromise. Standalone electronic drum machines have been around for years, and now even inexpensive small synthesizers often include several built-in percussion patterns, letting you switch from tango to rock to bossa nova riffs with the push of a button.

While you may associate these incessant, repetitive rhythms with tacky lounge singers or the worst of house music, real drum machines can be much more versatile. They let you customize your rhythms with a variety of percussion instruments, and can be very useful for experimentation when composing or arranging music, even if you switch to real drummers for performances or recording sessions. As an accompaniment to a solo guitar, piano, saxophone, or whatever, drum machines can be a lot of fun.

DRUM MACHINES AND SEQUENCING

A drum machine is a sequencer, but a special case. Back in the old days (two decades ago), sequencers were standalone devices that could store a sequence of musical notes and play them back, very often repeated in a cyclic pattern. Several forward-looking rock bands used sequencers during that period, including Pink Floyd, The Who, and Tangerine Dream. During the mid and late 1970s, sequencers became quite common in disco and some varieties of New Wave rock.

Standalone sequencers are still used

Creating a Computer Drum Machine, Part 1

■ The MIDI drum machine program presented here lets you interactively program a sequence of percussion sounds for automated playback at a selectable tempo and volume.

in performance settings, although for studio or home recording they've largely been replaced with computers. Because of the increased storage capacity of a computer, sequencing software can handle entire multi-instrument compositions rather than just basic repeated patterns of notes.

Drum machines are somewhat simpler than full-fledged sequencers, though. Compositions played by sequencing software involve (at the very least) three parameters: pitch, time, and the instrument voice. Because each of the various percussion instruments played by drum machines has a single pitch (or no definable musical pitch at all), drum machines can be limited to two parameters: the percussion instrument and time.

In this column and the next two, I'll describe a computer drum machine program called DRUM that I wrote for Windows with Multimedia Extensions. This program lets you construct a sequence of up to 32 notes using 47 different percussion sounds. The program plays the sequence repetitively at a selectable tempo and volume. For accurate timing, DRUM

requires a dynamic link library called DRUMDLL, which I'll describe in the next column. The final column will discuss a second module used in the program that has code to store percussion patterns on-disk.

THE MIDI CHANNELS

As I've discussed in previous columns, a multimedia PC requires an internal synthesizer based on the industry-standard Musical Instrument Digital Interface (MIDI). A multimedia PC also has at least one MIDI Out port for connecting an external MIDI synthesizer, and a MIDI In port for connecting an external MIDI controller (such as a keyboard).

Multimedia Windows includes support for MIDI through function calls beginning with the prefixes `midiOut` and `midiIn`, and through the Media Control Interface (MCI). As we've seen, the primary purpose of the `midiOut` functions is to send 2-, 3-, and 4-byte MIDI messages to a synthesizer to play musical notes. Most MIDI messages include a 4-bit code that identifies a MIDI channel. Generally, a Program Change message is sent to a synthesizer to select an instrument voice for a particular channel. Then, Note On and Note Off messages for that channel play particular pitches using that instrument voice. These messages include key numbers to identify the note, where key number 60 is middle C. The use of 16 channels allows (in theory) 16 different instrument sounds to play simultaneously.

One channel, however, is usually reserved as a nonmelodic percussion channel. In this case, Note On messages do

not trigger different pitches for a particular instrument voice, but instead trigger different percussion sounds based on the key numbers.

GENERAL MIDI MODE

The MIDI Manufacturers Association has recently defined a standard for synthesizers to facilitate the interchange of computer-based MIDI sequences. This standard is called General MIDI Mode. In particular, General MIDI Mode defines a collection of 128 instrument voices selectable with Program Change messages. It also assigns channels 0 through 8 and 10 through 15 as the melodic channels for which these instrument voices may be chosen. (The term *melodic* implies that different key numbers play different pitches.) Channel 9 is the percussion channel, for which 47 different percussion sounds are defined.

When using the percussion channel, you should send it a Program Change message for instrument voice 0. You can then play the 47 different percussion sounds by sending Note On and Note Off messages using key numbers ranging from 35 (an acoustic bass drum) through 81 (a triangle).

Multimedia Windows generally adheres to the General MIDI Mode specification, with one significant departure: Because many inexpensive MIDI synthesizers cannot match the level of polyphony (the number of simultaneous sounds) implied by General MIDI Mode, Multimedia Windows classifies synthesizers as either base-level or extended.

An *extended synthesizer* (capable of playing nine melodic instruments with 16-note polyphony and percussion with 16-note polyphony) uses channels 0 through 8 for the melodic voices and channel 9 for percussion. This is the same as General MIDI Mode, but without the top six channels. A *base-level synthesizer* (capable of playing three melodic instruments with 6-note polyphony and percussion with 3-note polyphony) uses channels 12 through 14 for the melodic voices and channel 15 for percussion.

If you have a synthesizer that uses a different channel for percussion, or if it has a percussion channel in which the key numbers trigger percussion sounds other than the ones defined by Multimedia Windows, that's a job for the MIDI Mapper. This MIDI output device uses mapping tables (which can be created in the MIDI Mapper utility invoked from the Control Panel) to alter MIDI messages on their way to a synthesizer.

USING THE DRUM PROGRAM

We are now ready to start up the program. When you first run DRUM, it looks like Figure 1. The 47 different percussion instruments are listed by name in two columns on the left half of the window.

(Figuring out how to fit these names on the screen was one of the hardest jobs in designing this program!) The grid on the right is a two-dimensional array of percussion sound versus time. Each instrument is associated with a row in the grid. The 32 columns are 32 beats. If you think of these 32 beats as occurring within a measure of 4/4 time (four quarter notes per measure), then

each beat corresponds to a 32nd note.

When you select Running from the Sequence menu, the program will attempt

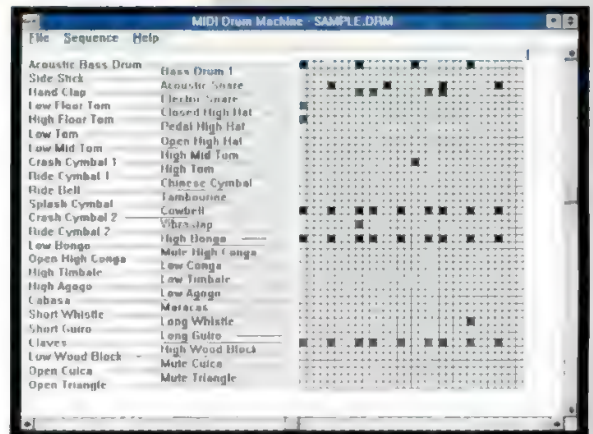


Figure 2: This shows the DRUM program with a sequence for both base-level and extended synthesizers.

to open the MIDI Mapper device. If it's unsuccessful, you'll get a message box. Otherwise, you'll see a little "bouncing ball" skip across the bottom of the grid as each beat is played.

You can click with the mouse anywhere within the grid to play a percussion sound during that beat. Use the left mouse button for a base-level synthesizer; the square will turn light gray. Use the right mouse button for an extended synthesizer; the square will turn dark gray. If you click with both mouse buttons (either together or independently), the square will turn black and the percussion sound will be heard on both a base-level and an extended synthesizer. Clicking again with either or both buttons will turn off the sound for that beat.

Across the top of the grid is a dot every four beats. Those dots simply make it easier to pinpoint your button clicks without too much counting. At the upper-right-hand corner of the grid is a colon and bar (:|) that resembles a repeat sign used in traditional music notation and indicates the length of the sequence. You can click with the mouse anywhere above the grid to put the repeat sign someplace else. The sequence plays up to but not including the beat beneath the repeat sign. If you want to create a waltz rhythm, for example, you should set the repeat mark for some multiple of three beats.

The horizontal scroll bar controls the velocity byte in the MIDI Note On messages. This generally affects the volume

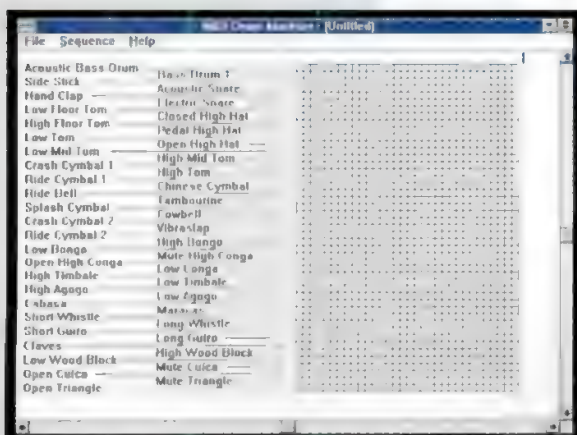


Figure 1: This shows how the DRUM program looks at start-up.

of the sounds, although it may also affect timbre in some synthesizers. The program initially sets the velocity scroll bar thumb in the center position.

The vertical scroll bar controls the tempo. This is a logarithmic scale ranging from 1 second per beat when the thumb is at the bottom to 10 milliseconds per beat at the top. The program initially sets the tempo at 100 milliseconds (one-tenth of a second) per beat, with the scroll bar thumb in the center.

The File menu allows you to save and retrieve files with the extension .DRM, a format I invented. These files are fairly small (512 bytes) and use the RIFF file format, which is recommended for all new Multimedia Windows data files. The .DRM files include the data for both base-level and extended synthesizers, the number of beats for the sequence, the velocity, and the tempo.

The About option from the Help menu displays a dialog box that contains a very brief summary of the use of the mouse on the two scroll bars and their functions.

Finally, the Stopped option from the Sequence menu stops the music and closes

the MIDI Mapper device after finishing the sequence being executed.

DEVICE-INDEPENDENT .DRM FILES

Let's say you and some of your friends all have my DRUM program and use it to create new and fascinating percussion sequences, which you pass around to each other in .DRM files. Or perhaps you're interested in creating a collection of .DRM files yourself and uploading them to PC MagNet. If you do, each .DRM file should include sequences for both base-level and extended synthesizers. Otherwise, some people who try to play the file won't hear anything!

The sequence for base-level synthesizers should have 3 or fewer percussion sounds per beat; those for extended synthesizers can include up to 16 percussion sounds per beat. The result will look something like the DRUM screen display shown in Figure 2.

Though it's not readily discernible in the screenshot, some of the grid squares are black (meaning that the percussion

sound is played on both base-level and extended synthesizers), and others are dark gray (meaning that the percussion sound is played only on extended synthesizers). At no time are more than three percussion sounds played on the base-level synthesizer.

There's nothing wrong with trying to play more than three simultaneous percussion sounds on a base-level synthesizer, of course, but there's no guarantee that you'll hear them all. Some synthesizers will give highest priority to the notes that come first and discard the rest when the limit has been reached, while others give highest priority to notes that come later and turn off the earlier notes.

It's probably easiest to make the sequence for a base-level synthesizer a subset of the extended-synthesizer sequence. But there are alternatives. You may discover a more satisfactory solution in completely rethinking an arrangement for a base-level synthesizer.

The preparation of MIDI sequences for both base-level and extended synthesizers is very important in creating device-independent MIDI data for Multimedia Windows. And keep in mind that you have the freedom to make the base-level sequence much different from the extended-synthesizer sequence to account for the lower number of simultaneous voices. It is for such flexibility that the designers of Multimedia Windows made the base-level synthesizer channels separate from and not a subset of the extended-synthesizer channels.

THE DRUM SOURCE CODE

You can download all source code for DRUM, including the DRUM.EXE executable and two dynamic link libraries from PC MagNet. Figure 3 lists all the files involved, with brief descriptions.

In the next column, I'll show code for the DRUMDLL dynamic link library. This DLL performs all the midiOut function calls. To achieve the precision required of a program such as this (which can play sequences as quickly as 10 ms. per beat), DRUMDLL makes use of the Multimedia Windows high-resolution timer, using functions beginning with the prefix *time*. Without these functions, DRUM would not be able to play faster than 55 ms. per beat, and would be dependent on the mushy, imprecise nature of the normal Windows timer.

Meanwhile, have fun with the program. Class resumes in two weeks. ■

PC MAGAZINE DRUM'S SOURCE FILES	
File	Description
DRUM.MSC	Make file for creating DRUM.EXE using Microsoft C 7.0
DRUM.BCP	Make file for creating DRUM.EXE using Borland C++ 3.0
DRUM.C	Main source code file for DRUM.EXE
DRUM.RC	Resource script containing menu and dialog box templates
DRUM.H	Header file containing IDs used in the resource script
DRUM.ICO	Icon file
DRUM.DEF	The module definition file for DRUM.EXE
DRUM.EXE	The executable
DRUMFILE.C	Source code file with file dialog box functions and file I/O routines, used in creating DRUM.EXE
DRUMFILE.H	Header file containing definitions of functions in DRUMFILE.C
DRUMDLL.MSC	Make file for creating DRUMDLL.DLL using Microsoft C 7.0
DRUMDLL.BCP	Make file for creating DRUMDLL.DLL using Borland C++ 3.0
DRUMDLL.C	Source code file for DRUMDLL.DLL
DRUMDLL.H	Header file containing definitions of the DRUM structure and functions in DRUMDLL.C
DRUMDLL.DEF	The module definition file for DRUMDLL.DLL
DRUMDLL.DLL	Required DLL for DRUM.EXE
COMMDLG.DLL	Dialog procedures for File Open and Save options. (This dynamic link library is part of Windows 3.1, but may be distributed by developers with applications that run under Windows 3.0)
SAMPLE.DRM	A sample .DRM file containing the sequence shown in Figure 2

Figure 3: These are the files associated with the DRUM program; they are all available for downloading from PC MagNet.

by
Ray Duncan

Power Programming

Processing Ink In a Pen Windows Application

In our discussions of Pen Windows over the last seven issues, we've looked at two basic types of application programs: pen-aware apps, which accept handwritten input via dialogs and HEDIT or BEDIT controls, and pen-centric apps, which obtain handwritten input via the ProcessWriting() or Recognize() APIs and process WM_RCRESULT messages. In this, the last installment of this series, we'll penetrate one level deeper into the murky catacombs of Pen Windows and talk about a more sophisticated class of application: programs that actually process *ink*, the trail left on the screen as a result of pen motion. As we bid farewell to Pen Windows, we are leaving many interesting nooks and crannies of the system unexplored—custom recognizers, screen drivers, and pen drivers, to name a few—so we may return to this topic in the future, if reader interest and market acceptance warrant.

THE REPRESENTATION OF INK

When you set out to design a Pen Windows program that will retrieve, inspect, and display ink directly, it will help you to think of ink as a completely new, highly complex data type with essentially no parallels to anything in your previous Windows experience. Getting at the ink from a particular input operation is a significant amount of work; the information is spread across a number of different data structures, and it's fairly impractical to interpret the ink without the aid of Pen Windows API functions. On the other hand, Pen Windows lets you view the ink at any of several levels of abstraction: as individual points captured by the pen driver, as strokes that connect the points between "pen-up" conditions, as collections of strokes representing a single character or gesture (a glyph), as a symbol graph that encodes the possible translations of a collection of glyphs, and, of course, as translated characters or strings. The structures are related in powerful ways; for example, you can easily corre-

■ Designing a Pen Windows program that will retrieve, inspect, and display ink directly is a complex undertaking with no parallels to anything in your previous Windows experience, but our demonstration program will point you in the right direction.

late an individual translated character with its original points and strokes on the screen, then transform and redraw the writing using standard Windows Graphics Device Interface (GDI) functions.

The minimum prerequisite for processing ink is to establish an area of the screen for written input (typically a child window) and then supply the bounds of this area to the Recognize() function or ProcessWriting() function. The function calls the pen driver and screen driver to accept input and place ink on the screen, calls the recognizer module to parcel the ink into glyphs and translate it into a symbol graph, and then packages the results in several structures.

The most important of these structures, called RCRESULT, was discussed in detail in the previous two columns. The address of the RCRESULT structure is shipped to the application as the "long parameter" of a WM_RCRESULT message. After the application's message handler returns

to Windows, the memory occupied by the various result structures is released, and Windows then returns to the point of the original ProcessWriting() or Recognize() call.

The most important components of the RCRESULT structure are just pointers that lead you to highly abstracted data on the one hand and highly primitive data on the other, as shown in Figure 1. RCRESULT contains an embedded symbol graph (SYG) structure, which leads you to arrays of symbol element (SYE) and symbol correspondence (SYC) structures. The SYE structures encode the translated characters and gestures, and the SYC structures link the characters and gestures to the original strokes that they were translated from. The symbol graph and its dependent SYE and SYC structures can be translated into symbol value strings with the aid of the Pen Windows function EnumSymbols(), as we saw in the last column, and the symbol strings in turn can be translated into ordinary ANSI character strings with the function SymbolToCharacter().

RCRESULT also contains a *pen data handle* (hpendata), which is actually just a handle for a standard Windows global memory block. We say that the block contains the ink, but the truth is somewhat more complicated: It contains the individual points collected by the pen driver, but it also contains information about how the points are assembled into strokes, the temporal relationships between the points, the bounding rectangle of the points (in tablet coordinates), and the ink's width and color.

Fundamental information about the pen data block can be obtained with the Pen Windows function `GetPenDataInfo()`. This function fills in a structure called `PENDATAHEADER`, which summarizes the ink data, and another structure called `PENINFO`, which describes the characteristics of the pen input device.

Remember that all the structures containing ink and the translated results are allocated by Pen Windows dynamically and are valid only for the duration of the `ProcessWriting()` or `Recognize()` function call. If we want to hang onto any of this data for use at some later point, we need to allocate memory during the processing of the `WM_RCRESULT` message and copy the data into that memory.

In the case of the ink data block this step is straightforward, because Pen Windows provides us with the `DuplicatePenData()` function expressly for this purpose. When a program calls `DuplicatePenData()` with the pen data handle from an `RCRESULT` structure, Pen Windows allocates a new global memory block on behalf of the program, copies the pen data into it, and returns a new pen data handle, which will remain stable until the program releases it with `DestroyPenData()` or terminates its execution.

Preserving the contents of the `RCRESULT` structure is also easy, since the structure is small enough that you can simply allocate a static `RCRESULT` structure inside your program's data segment and copy the `WM_RCRESULT` message's `RCRESULT` structure into it.

What about the arrays of SYE and SYC structures? Pen Windows provides no shortcuts here. To preserve this data, you need to extract the number of SYE and SYC elements from the SYG structure embedded in `RCRESULT`, allocate sufficient memory to hold that many SYEs and SYCs, extract the far pointers to the original SYE and SYC arrays from the SYG structure, and explicitly copy the data to its new location. As the last step, you update the SYE and SYC array pointers and pen data handle in the static copy of the `RCRESULT` structure to refer to the new copies of these structures. This allows you to use identical routines to operate on either the saved `RCRESULT` or a freshly minted `RCRESULT` passed to the program in a `WM_RCRESULT` message.

Now let's think about some simple ways in which we might put this carefully hoarded pen data to work. Imagine,



MAJOR COMPONENTS OF THE RCRESULT STRUCTURE

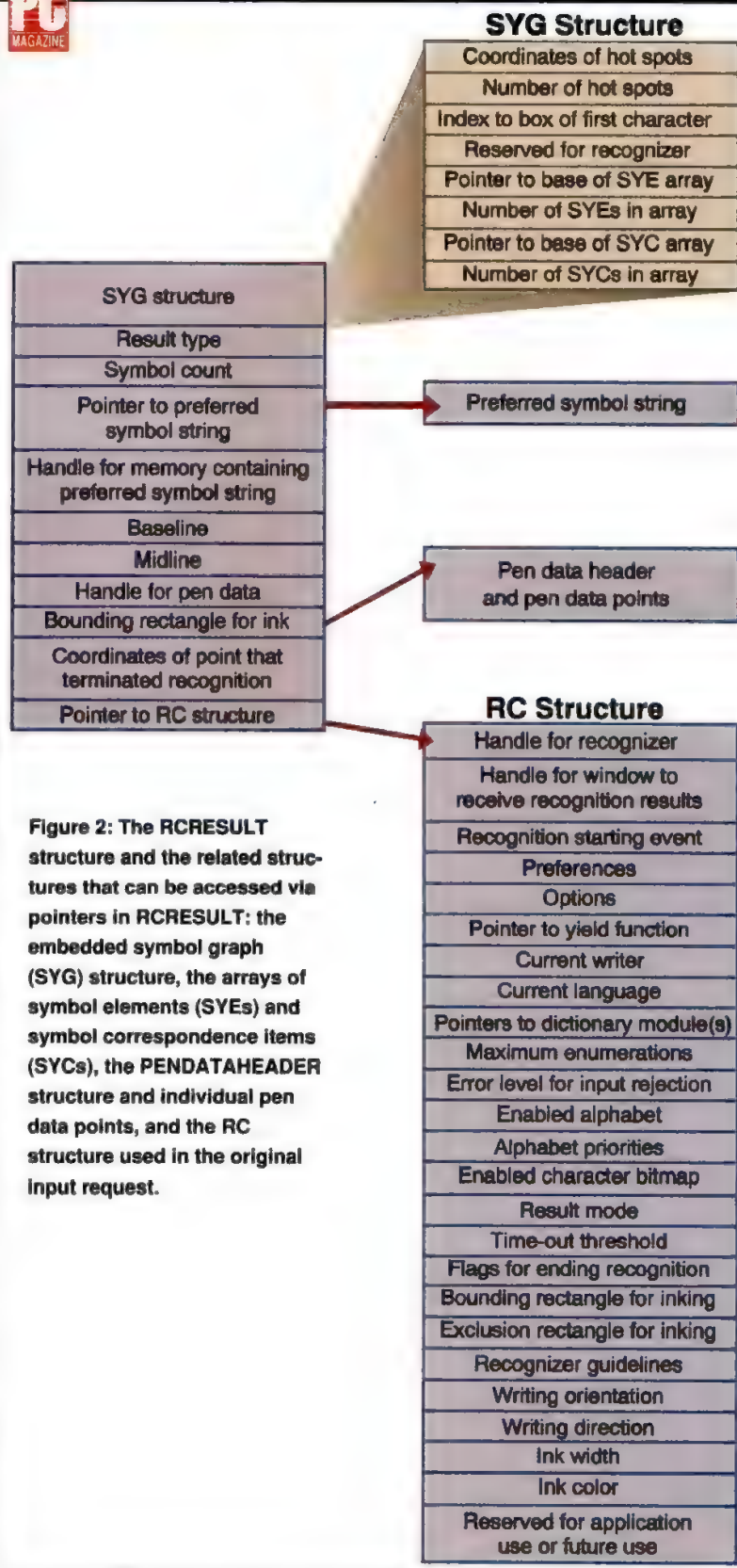
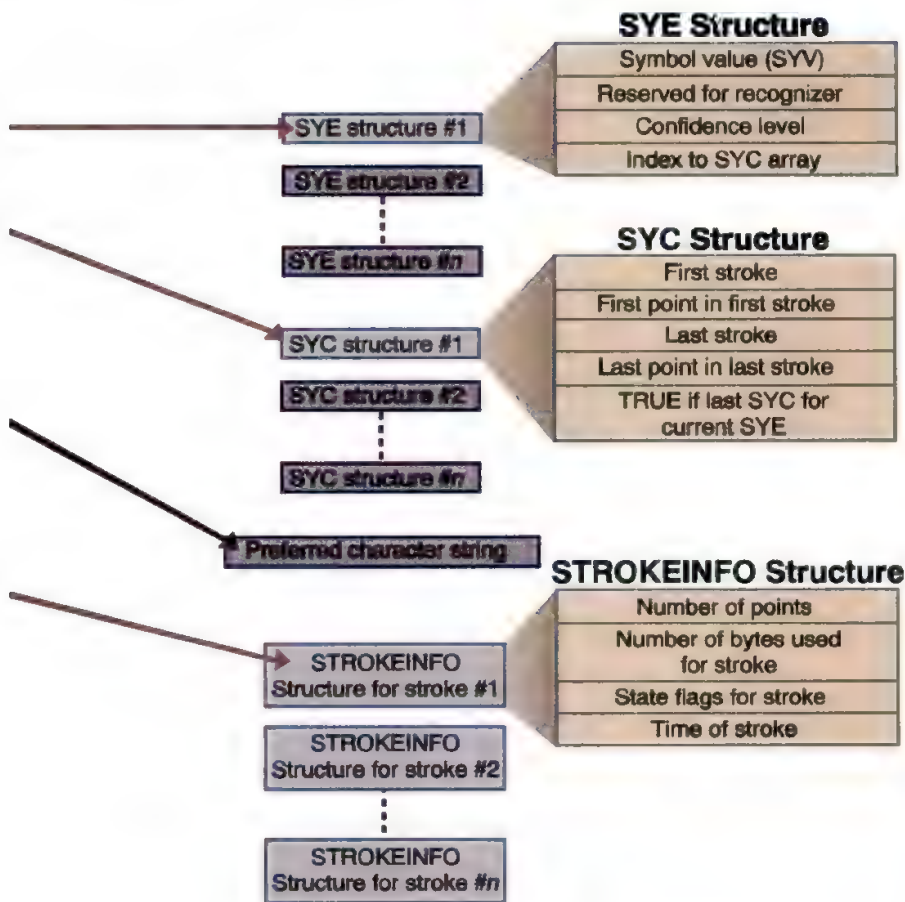


Figure 2: The RCRESULT structure and the related structures that can be accessed via pointers in RCRESULT: the embedded symbol graph (SYG) structure, the arrays of symbol elements (SYEs) and symbol correspondence items (SYCs), the `PENDATAHEADER` structure and individual pen data points, and the RC structure used in the original input request.



for example, that we are using `Recognize()` to capture a specimen of the user's signature. We don't really care about the translated results at all (they aren't going to be worth much anyway, because the Pen Windows recognizer is designed to translate only printed characters), but we do want to save the ink and eventually display it in other contexts (such as a printed document).

This turns out to be a simple task. You just call `DuplicatePenData()` during the `WM_RCRESULT` message, store away the new pen data handle, and ignore the rest of the `RCRESULT` message. When you want to display the signature again, you call `MetricScalePenData()` to translate the pen data from tablet coordinates into display coordinates, `ResizePenData()` to scale the signature to the size of the display area, and `DrawPenData()` to put

the ink back onto the screen in the desired region. Since the pen data resides in an ordinary memory block, you're perfectly

CompactPenData() can actually compress pen data to minimize its memory requirements.

free to write the whole lump of data into a file on-disk and read the data back into memory whenever it's needed for rendering on the screen or another device.

If space is dear, you can apply the

function `CompactPenData()` to the pen data block. Depending on its parameters, `CompactPenData()` can remove identical points, remove colinear points, remove pressure information, or actually apply a compression algorithm to the pen data to minimize its memory requirements.

Now let's consider an example that lies at the other extreme. Suppose we want to write an application that will maintain a document in both its original handwritten form and its textual form. Clearly, the program must be able to establish a one-to-one relationship between each translated character and the corresponding ink before it can do much else. This doesn't turn out to be too difficult, either.

The program can begin with the symbol graph, walking through the array of SYE structures and deciding which characters should be the preferred translations. Each SYE contains the index of an SYC structure, which in turn contains the numbers of the first and last strokes of the intended character's written glyph. The actual strokes are retrieved from the pen data block with the aid of the Pen Windows API function `GetPenDataStroke()` or `GetPointsFromPenData()`. `GetPenDataStroke()` returns a far pointer to a list of the *x,y* coordinates for the points in a particular stroke and it also fills in a structure called `STROKEINFO`, which contains state information for the stroke, a time stamp, and the number of points in the stroke. `GetPointsFromPenData()` is similar, but it copies the points for a particular stroke from the pen data block into a buffer specified by the program.

There's yet another situation where you might want to handle ink directly. If you want your program to be extremely responsive to the user, you might choose to suck up the ink without translating it, put it away, and process it later when the user has moved on to another task in the application. This is easily implemented by calling `Recognize()` with a special flag that tells it to defer translation, saving the ink with `DuplicatePenData()` during the `WM_RCRESULT` message, and then passing the pen data handle to the function `RecognizeData()` for translation at some later time. `RecognizeData()` is like `Recognize()` without the input step; it doesn't call the pen driver or screen driver, but it is controlled by an RC (Recognition Context) data structure and kicks back its results in an `RCRESULT` structure and a `WM_RCRESULT` message in exactly the same manner as `Recognize()`.

SAVERESULTS() FUNCTION

```
// SaveResults -- copies the RCRESULT structure to local storage,
// creates copies of the SYE and SYC arrays in global memory blocks,
// and creates a duplicate pen data header block. This allows all of
// the pen result data to be accessed outside the WM_RCRESULT processing.
//
void SaveResults(LONG lParam)
{
    LPSTY lpSty;           // temp ptr to SYE array
    LPSTC lpStc;           // temp ptr to SYC array
    int i;                 // scratch variable

    if(hSty)               // free old data if necessary
    {
        GlobalUnlock(hSty); // unlock SYE and SYC blocks
        GlobalFree(hSty);   // release SYE and SYC blocks
        GlobalFree(hStc);
        DestroyPenData(rcresult.hpendata); // release ink data block
    }

    rcresult = *(LPCRESULT) lParam; // make local copy of RCRESULT

    hSty = GlobalAlloc(GMEM_MOVEABLE, // allocate memory block for
        (rcresult.syg.csy * sizeof(STY))); // copy of SYE array
    hStc = GlobalAlloc(GMEM_MOVEABLE, // allocate memory block for
        (rcresult.syg.csy * sizeof(STC))); // copy of SYC array
    lpSty = (LPSTY) GlobalLock(hSty); // lock down the blocks
    lpStc = (LPSTC) GlobalLock(hStc); // and get far pointers

    for(i = 0; i < rcresult.syg.csy; i++) // copy SYE array to our
        lpSty[i] = rcresult.syg.lpSty[i]; // own memory block

    for(i = 0; i < rcresult.syg.csy; i++) // copy SYC array to our
        lpStc[i] = rcresult.syg.lpStc[i]; // own memory block

    rcresult.syg.lpSty = lpSty; // update pointers in
    rcresult.syg.lpStc = lpStc; // local RCRESULT structure

    rcresult.hpendata = // make copy of ink data
        DuplicatePenData(rcresult.hpendata, GMEM_MOVEABLE);
}
```

Figure 2: The SaverResults() function is called during processing of a WM_RCRESULT message to save a copy of the RCRESULT structure, SYE array, SYC array, and pen data block.

SHOWPENINK() FUNCTION

```
// ShowPenInk -- redraws original ink in right-hand window
//
void ShowPenInk(LPCRESULT rcresult)
{
    PENDATAHEADER pdh; // pen data header
    HPENDATA hpendata; // duplicate ink handle
    LPPENDATA lppendata; // far pointer to pen data
    char buff1[256]; // scratch buffer for output
    RECT rect; // client rect for output win
    HDC hdc; // HDC for output window

    hdc = GetDC(hWndText); // get device context
    GetClientRect(hWndText, &rect); // get client rectangle

    rect.left += 10; // calculate bounding
    rect.right += -10; // rectangle for redrawn ink
    rect.top += ((rect.bottom-rect.top)/2) + 10;
    rect.bottom += -10;

    // duplicate original ink in a new PENDATA memory block
    hpendata = DuplicatePenData(rcresult->hpendata, GMEM_MOVEABLE);

    // get PENDATAHEADER for duplicated ink memory block
    GetPenDataInfo(hpendata, &pdh, NULL, 0L);

    // display total strokes and points from PENDATAHEADER
    vsprintf(buff1, "Strokes = %u", pdh.cStrokes);
    DisplayLine(buff1);
    vsprintf(buff1, "Points = %u", pdh.cPnt);
    DisplayLine(buff1);

    // display original bounding rectangle from PENDATAHEADER
    DisplayLine("Bounding rectangles:");
    vsprintf(buff1, "Original = (%d,%d)-(%d,%d)",
        pdh.rectBound.left, pdh.rectBound.top,
        pdh.rectBound.right, pdh.rectBound.bottom);
    DisplayLine(buff1);

    // rescale pen data points for display
    MetricScalePenData(hpendata, PDTS_DISPLAY);

    // display rescaled bounding rectangle from PENDATAHEADER
    GetPenDataInfo(hpendata, &pdh, NULL, 0L);
    vsprintf(buff1, "Rescaled = (%d,%d)-(%d,%d)",
        pdh.rectBound.left, pdh.rectBound.top,
        pdh.rectBound.right, pdh.rectBound.bottom);
    DisplayLine(buff1);

    // resize pen data to fit in lower half of output window
    ResizePenData(hpendata, &rect);

    // display resized bounding rectangle from PENDATAHEADER
    GetPenDataInfo(hpendata, &pdh, NULL, 0L);
    vsprintf(buff1, "Resized = (%d,%d)-(%d,%d)",
        pdh.rectBound.left, pdh.rectBound.top,
        pdh.rectBound.right, pdh.rectBound.bottom);
    DisplayLine(buff1);

    // draw a frame for the ink in lower half of output window
    Rectangle(hdc, rect.left-2, rect.top-2, rect.right+2, rect.bottom+2);

    // redraw ink within the frame
    DrawPenData(hdc, NULL, hpendata);

    DestroyPenData(hpendata); // release duplicate ink block
    ReleaseDC(hWndText, hdc); // release device context
}
```

Figure 3: This function resizes and redraws the ink that was saved during the processing of the WM_RCRESULT message.

AN INK-AWARE APPLICATION

This installment's Pen Windows demonstration program, DEMO8.EXE, illustrates several of the most basic aspects of ink processing. From a user's point of view, DEMO8.EXE looks just like the DEMO7.EXE program in the previous column, and in fact DEMO8's capabilities are a superset of DEMO7. DEMO8 divides its main window into two child windows: a writing input window on the left and an output window on the right. The contents of the output window are controlled by the Options pop-up on the menu bar.

Like DEMO7, the DEMO8 program can display the contents of an RCRESULT structure, dump out a symbol graph,

or enumerate the strings that can be derived from a symbol graph. DEMO8, however, knows several new tricks. It can display the contents of the PENDATAHEADER structure, the PENINFO structure, and the individual STROKEINFO structures. It can also save, resize, and redraw the user's ink in a rectangle in the output window.

Since DEMO8's source code is quite long and much of it is similar to programs DEMO1 through DEMO7, we're not printing the complete code here. Figures 2 and 3, however, contain the source code for the program's two most interesting functions: SaveResults() and ShowPenInk(). SaveResults() grabs copies of the RCRESULT structure, SYE array, SYC array, and pen

data block during the processing of the WM_RCRESULT message. ShowPenInk shows how to use MetricScalePenData(), ResizePenData(), and DrawPenData() to put ink back on the screen in any desired size and location. The complete set of source files necessary to rebuild DEMO8.EXE, as well as the executable file, can be downloaded from PC MagNet. See page 10 for access instructions.

THE IN-BOX

Please send your questions, comments, and suggestions to me at any of the following electronic-mail addresses:

PC MagNet: 72241.52
MCI Mail: rduncan
BIX: rduncan

by
Sal Ricciardi

Databases

PICK LISTS IN dBASE IV

Unfortunately, *dBASE IV* 1.1 does not allow multiple fields in pick lists, nor can pick lists be edited on the fly. But the *BROWSE* command can be used to simulate a pick list, offering multiple fields and editability. However, the inability to exit such a simulated pick list with the intuitive Enter key has long hindered programmers from using this method. Below is an improved way to use the *BROWSE* command in lieu of a pick list. With this method, the Enter key does exit (and save changes in) the *BROWSEd* database.

The code fragment shown below involves a database of subscribers containing first-name and last-name fields. It defines a window and reassigns the Enter key to send a Ctrl-End keystroke. It displays two editable fields of the database and allows the user to exit simply by pressing the Enter key.

```
USE SUBSCRIB ORDER Lname
DEFINE WINDOW Subwind
  FROM 8,1 TO 28,48
ON KEY LABEL Ctrl-M
  KEYBOARD CHR(23)
BROWSE FIELDS Lname, Fname
  NOFOLLOW NODELETE
  NOAPPEND WINDOW Subwind
DEACTIVATE WINDOW Subwind
ON KEY LABEL Ctrl-M
```

Note that it's necessary to restore the original key assignment of the Enter key after the user has exited the *BROWSEd* database.

Jeffrey D. Skibbe
Joplin, Missouri



There's no doubt that it's much easier to select from a pop-up list than to type in your choice manually. The *DEFINE POPUP* command has an option that lets you display the contents of a single field, but if you want more than one field, or if you want to allow editing of the data, a *BROWSE* is certainly the way to go.

- **PICK LISTS IN dBASE IV:** An improved way to use *BROWSE* for multifield pick lists in *dBASE IV*.
- **USING TONE TO DELAY:** Using the *TONE* function to provide a *DELAY* in *Clipper*.
- **OPTIMIZING FIELD SIZES:** A faster way to find wasted space in your character fields in *dBASE* and *FoxPro*.

Normally, a *BROWSE* can be terminated using either Ctrl-End or Esc. In a popped-up pick list, letting the user simply move the cursor to the appropriate choice and press the Enter key is far more intuitive. In order to let the user do this, you must intercept the Enter keystroke and have it feed Ctrl-End to *BROWSE* instead, since *BROWSE* needs a Ctrl-End—not an Enter—to exit. This way the *BROWSE* will terminate normally, and the database will be positioned at the record that the user selected.

In *dBASE*, Ctrl-M is the label for the Enter key, and CHR(23) corresponds to Ctrl-End, so the statement

```
ON KEY LABEL Ctrl-M
  KEYBOARD CHR(23)
```

redefines the Enter key to send a Ctrl-End to the *BROWSE*. Of course, as soon as the *BROWSE* terminates, you must remember to change the Enter key back to normal. This is accomplished by the following line:

```
ON KEY LABEL Ctrl-M
```

By not specifying anything after Ctrl-M,

you instruct *dBASE* to restore Ctrl-M to its default setting. Most uses for a pick list are read-only in nature. In most circumstances you want to offer the user a choice but not the ability to change the choices. The *NOEDIT* option can be used on the *BROWSE* command to prevent any changes to the information shown by the *BROWSE*, making the pick list read-only.

USING TONE TO DELAY

I read about the user-defined function *DELAY()* for *Clipper* in the November 26, 1991, issue and thought you might like to see an even easier way to solve this problem, at least in *Clipper* 5.0. The *DELAY()* UDF that follows is based on the fact that the *Clipper* function *TONE()* takes two parameters: the frequency of the sound and the duration of the sound in timer ticks. While the normal purpose of *TONE()* is to produce sound, since frequencies below 20 hertz (cycles per second) are inaudible to the human ear but can still be entered, you can produce an inaudible sound for the desired interval.

Here's the function:

```
FUNCTION DELAY(nTicks)
  TONE(8, nTicks)
RETURN NIL
```

where *nTicks* represents the number of timer ticks to use for the delay. Remember that 18.2 ticks represents approximately 1 second. I'm sure that there are some other people who have also discovered this neat little trick, but I thought I'd pass it along anyway.

Paul D. Beretta
Ellenville, New York



Thanks for the tip. Not only was I unaware of this use of the *TONE()* function, but so was my Nantucket Corp. contact. Using the *TONE()* function in this manner does indeed work to simulate a clock-tick delay function. It's still unfortunate, however, that Nantucket

doesn't provide what *Clipper* should have had all along: its own honest-to-goodness, built-in delay function. In fact, every *dBASE*-like product should have a built-in, tightly written delay function that delays in timer ticks. You shouldn't have to resort to using the `TONE()` function, which was clearly intended for another purpose.

In the meantime, users of *Clipper*, Summer 87, will find that the user-defined `DELAY()` function shown above works there as well.

OPTIMIZING FIELD SIZES

In the August 1991 Databases column, you published `FIELDSIZ.PRG`, a utility that is able to determine the longest character string in a field and then report the number of bytes of disk space that could be saved by shortening the field lengths. While I applaud the efforts of Mr. Ferreira, who created the previously mentioned utility, I have discovered an even faster way to accomplish the same objective. Consider the following approach.

You have a `.DBF` file containing a field length of 40 characters. Assume the maximum current usage in that field is 25 characters. To find the maximum current usage, type

```
USE FILENAME
INDEX ON LEN(RTRIM(FIELDNAME)) TO
FILENAME
GO BOTTOM
? LEN(RTRIM(FIELDNAME))
25
```

That's it, the longest data.

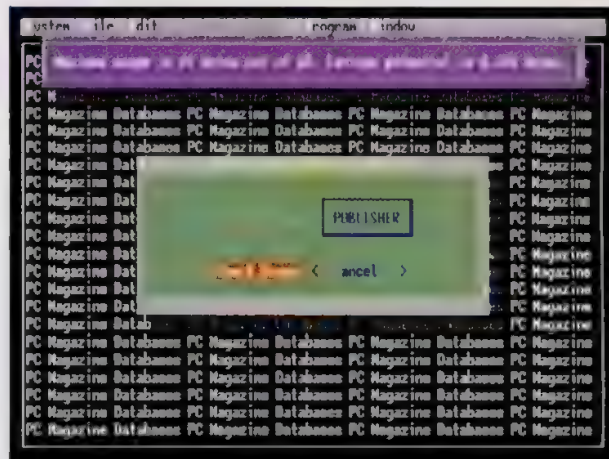
Since the file is INDEXed on the length of the DATA in the field, the last record will have the longest data length of any record in the file.

If you want to calculate the space savings you might achieve by reducing the length of this field, issue the following commands while the record pointer is at bottom:

```
.totl = LEN(FIELDNAME)
.needl = LEN(RTRIM(FIELDNAME))
.extra = TOTL - NEEDL
.savesp = extra * RECCOUNT()
```

One of the most powerful features of *dBASE III Plus* and *dBASE IV* is the `INDEX` command in those programs. It is preferable to the `SORT` command because you can `INDEX` on an expression. The only time `SORT` is needed is if you

Figure 1: This *FoxPro* 2.0 program lets you calculate whether or not there is any wasted space in your character fields.



want the file to be physically sorted.

Vern Semrad
Tampa, Florida



This technique is fast and easy, provided you have the disk space required for the index.

Indexing on the length of the trimmed character field places the records with the most characters at the bottom of the index. Therefore, with such an index active, a simple check of the last record reveals the longest character length for that field. You'll want to delete the temporary index after checking each field using this technique.

I took the liberty of creating a *FoxPro* 2.0 program that combines this approach with a friendly front end (shown in Figure 1). To use the program, called `SPCCHK.SPR`, you just type

```
DO SPCCHK.SPR
```

from *FoxPro*'s command window. The program presents you with a dialog box containing a pop-up list of all the character fields in the currently open database. If a database is not currently in use, you'll be asked to select one.

To check the space usage for a particular field, you simply select the field to check in the pop-up and press Enter or click on the Check Usage button. Shortly thereafter, a message will appear telling you how much disk space can be saved, if any, by modifying the database structure to reduce the size of your character field.

The `SPCCHK.SPR` program uses

FoxPro's `AFIELDS()` function to populate an array with structure information on the currently open database. The array is then filtered to remove any noncharacter fields and redimensioned. Then the dialog box is displayed.

When the Check Usage push button is pressed, `SPCCHK` automatically creates the temporary index needed (using a unique filename generated by *FoxPro*'s `SYS(3)` function), performs the appropriate calculations, displays the results in a system window, and finally deletes the temporary index file. When you're finished examining fields, select the Cancel push button.

I generated the code for `SPCCHK` using the Screen Builder in *FoxPro* 2.0, which makes designing and programming this type of utility really fun to do. The resulting code is a little too long to print in this column, but you can download the code and screen files from PC MagNet. Look for `SPCCHK.ZIP` in the Databases library.

LET US HEAR FROM YOU

Share your database experience, tips, and techniques; we'll pay you \$50 for any submission we print. Mail your submission on a disk, accompanied by a printout, to Databases, *PC Magazine*, One Park Avenue, New York, NY 10016, or upload it to PC MagNet (see page 10 for access instructions). You may also contact Sal Ricciardi via PC MagNet, mailbox 72241.33. We regret that we are unable to acknowledge submissions or answer questions individually. ■

edited by
Sharon Terdeman

Languages

REDUCING PROGRAM SIZE

It's no secret that standard C library functions like `printf` can add about 2K to your executable program's size. I've long resigned myself to including `printf` in my programs (along with its cousin, `sprintf`); it's just so convenient. But they're not the only functions that can add significantly to your program's size: How about the standard time and date functions?

For instance, try adding a call to the `time` function or calls to both the `time` and `ctime` functions to your program. If your compiler is Microsoft C, your .EXE will jump by about 2K; with Borland C++ the program will grow by 4K. That's because the standard time and date functions pull in a lot of additional functionality that's not really needed in many programs.

■ **REDUCING PROGRAM SIZE:** Squeeze 2K to 4K out of your C programs with `DATETIME.C`.

To generate the current date and time in a formatted string, you would use

```
#include<time.h>
#include<stdio.h>

time_t t;

t = time(NULL);
printf(ctime(&t));
```

This would display, for instance,

Wednesday, February 12, 1992,
3:41:36.63pm

I wrote a function, `GetDateTime`, that does the same thing but keeps your program far smaller. `GetDateTime` works by calling the DOS Int 21h service routines to obtain the system date and time. It uses in-line assembler to set up these calls, and then calls `sprintf` to format the date-time string in a buffer passed to `GetDateTime` by the calling program. While including `sprintf` or one of its variants will, of course, add code to your program, it won't matter if you've already included it. Unlike the output of `ctime`, `GetDateTime` uses a standard 12-hour (rather than 24-hour) design-

DATETIME.C	COMPLETE LISTING
<pre>// datetime.c RHS 1/15/92 #include<stdio.h> #if defined(TRUE) #define TRUE 1 #endif #if defined(FALSE) #define FALSE 0 #endif #if defined(SMALL) void GetDateTime(char *buf) { char *days[7] = { "Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday" }; char *months[12] = { "January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", "December" }; unsigned char month, day, dow; unsigned char hour, minutes, seconds, hundredths; unsigned char pm = FALSE; unsigned year; #if defined(_BORLDC_) _AH = 0x2A; asm int 0x21; dow = _AL; year = _CX; month = _DH; day = _DL; _AH = 0x2C; asm int 0x21; hour = _CH; minutes = _CL; seconds = _DH; hundredths = _DL; #else _asm mov ah, 0x2a _asm int 21h #endif }</pre>	<pre>_asm mov dow, al _asm mov year, cx _asm mov month, dh _asm mov day, dl _asm mov ah, 0x2c _asm int 21h _asm mov hour, ch _asm mov minutes, cl _asm mov seconds, dh _asm mov hundredths, dl #endif if(hour > 12) { pm = TRUE; hour -= 12; } if(!hour) hour = 12; sprintf(buf, "%s, %s %d, %d, %d:%d:%d.%d", days[dow], months[month-1], day, year, hour, minutes, seconds, hundredths, (pm ? "pm" : "am")); } #if defined(BIG) #include<time.h> void GetDateTime(char *buf) { time_t t; t = time(NULL); sprintf(buf, "%s", ctime(&t)); } #else #error You must define SMALL or BIG in the program or on the command-line! #endif void main(void) { char buf[50]; GetDateTime(buf); printf("%s\n", buf); }</pre>

Figure 1: This program shows how to keep your program smaller by using a homegrown function rather than standard library routines to generate date-time strings.



DATETIME.EXE'S SIZE

Compiler	Using GetDateTime (SMALL defined)	Using time/ctime (BIG defined)	Difference
Microsoft C 6.0	6,397	8,817	2,420
Microsoft C/C++ 7.0	7,207	9,337	2,130
Borland C++ 2.0	6,632	11,494	4,862
Borland C++ 3.0	7,012	11,690	4,678

-All sizes in bytes

-All default compilation options used, with the exception of -DSMALL or -DBIG

Figure 2: This table shows how the size of DATETIME.EXE varies, depending on whether the GetDateTime function or the more traditional time/ctime approach is used.

nation and adds "am" or "pm" to the date-time string.

To show you how GetDateTime works and why homegrown functions like this are valuable, I wrote a small program, DATETIME.C, shown in Figure 1. DATETIME.C uses both the time/ctime and GetDateTime approaches to generating a date-time string. The two are segregated via compilation controls: You de-

fine BIG in the program or on the command line to use the time/ctime approach, or define SMALL to use GetDateTime (you'll generate a compiler error if you don't define one or the other).

Thus, to compile DATETIME to use GetDateTime with Microsoft C 6.0 or 7.0, use

```
CL -DSMALL datetime.c
```

And to compile with Borland C++ 2.0 or 3.0, use

```
BCC -DSMALL datetime.c
```

Just how much smaller will a program be if it uses GetDateTime instead of the traditional time/ctime approach? The table in Figure 2 shows the sizes of DATETIME.EXE when compiled with any of the compilers mentioned above. As you can see, the smallest difference in size is 2,130 bytes, when you compile with Microsoft C/C++ 7.0. And when you compile with Borland C++ 2.0, the difference is a whopping 4,862 bytes! So don't discount the value of rolling your own—especially when it comes to date and time functions!—*Richard Hale Shaw*

SPEAK YOUR LANGUAGE

Share your knowledge of BASIC, C, Pascal, and assembly language with Languages readers; we'll pay you \$50 for any tip we print. Please send a disk along with a printout. Mail your contribution to Languages, *PC Magazine*, One Park Avenue, New York, NY 10016, or upload it to PC MagNet. ■

DON'T GIVE MONEY TO STRANGERS.

Before you give to a heart organization, make sure it's one you trust: The American Heart Association. Since 1924 we've sponsored lifesaving education programs and funded \$900 million in research. Others may copy us, but they can't hold a candle to our heart and torch. To learn more, contact the American Heart Association, 7320 Greenville Ave., Box 20, Dallas, TX 75231.

You can help prevent heart disease. We can tell you how.



This space provided as a public service.

Buy with Confidence

In an effort to make your telephone purchasing a more successful and pleasurable activity, The Microcomputer Marketing Council of the Direct Marketing Association, Inc. offers this advice, "A knowledgeable buyer will be a successful buyer." These are specific facts you should know about the prospective seller before placing an order:

Ask These Important Questions

- *How long has the company been in business?*
- *Does the company offer technical assistance?*
- *Is there a service facility?*
- *Are manufacturer's warranties handled through the company?*
- *Does the seller have formal return and refund policies?*
- *Is there an additional charge for use of credit cards?*
- *Are credit card charges held until time of shipment?*
- *What are shipping costs for items ordered?*

Reputable computer dealers will answer all of these questions to your satisfaction. Don't settle for less when buying your computer hardware, software, peripherals and supplies.



Purchasing Guidelines

- *State as completely and accurately as you can what merchandise you want including brand name, model number, catalog number.*
- *Establish that the item is in stock and confirm shipping date.*
- *Confirm that the price is as advertised.*
- *Obtain an order number and identification of the sales representative.*
- *Make a record of your order, noting exact price including shipping, date of order, promised shipping date and order number.*

If you ever have a problem, remember to deal first with the seller. If you cannot resolve the problem, write to MAIL ORDER ACTION LINE, c/o DMA, 6 E. 43rd St., New York, NY 10017.

This message is brought to you by:

the MICROCOMPUTER
MARKETING COUNCIL
of the Direct Marketing
Association, Inc.
6 E. 43rd St.,
New York, NY 10017

MMCG
MICROCOMPUTER
MARKETING COUNCIL
of the Direct Marketing Association, Inc.

"Dedicated to serving
the direct buyer"

See how Dustin stacks up.

- ▶ Free Ground Shipping
- ▶ Same Day Shipping
- ▶ Overnight Delivery Available
- ▶ Corporate PO's Welcome
- ▶ APO's & FPO's Welcome
- ▶ 24-Hour FAX Order-Line
- ▶ Government & Educational Pricing
- ▶ No Minimum Orders
- ▶ Visa, MasterCard, & AMEX Accepted
- ▶ No Credit Card Charges Until Shipping

- ▶ No Credit Card Surcharges
- ▶ Thousands of Items in Stock
- ▶ The Latest Software Versions for your PC
- ▶ Manufacturer's Warranties & Documentation
- ▶ Call for Items Not Listed & Free Catalogue

ACCOUNTING/FINANCE

ACC PAC BPI 253.
DAC Accounting 95.
DAC Bonus Pack 139.
Managing Your Money 135.
Microsoft Money 55.
Moneycounts 35.
One Write + Complete 185.
Pacioli 39.
Peachtree III 159.
Peachtree III w/DQ 235.
Quicken 5.0 49.
Quicken Windows 49.
Timeslips III 205.
Turbo Tax/Quicken Bundle 85.
Turbo Tax Windows '91 85.
Turbo Tax '91 55.
Winvoice 175.

BUSINESS GRAPHICS

3D Charts To Go 65.
ABC Flowcharting 189.
Calendar Creator Plus 55.
Charmisma 2.1 345.
Dan Bricklin's Demo II 199.
Draw Perfect 285.
Easy Flow V7.0 205.
Flowcharting III 149.
Form Filler 95.
Form Tool Gold 3.0 65.
Freelance Graphics 349.
Freelance Graphics For Windows 349.
Freelance Graphics Competitive Upgrade 89.
Graph in the Box 2.2 449.
Harvard Draw Windows 409.
Harvard Graphics 3.0 409.

DESKTOP PUBLISHING

Adobe Fonts 319.
Adobe Illustrator 129.
Adobe Plus Pak 136.
Adobe Streamline 75.
Adobe TypeAlign 69.
Adobe Type Manager 69.
Adobe TypeSets 1,2,3 69.
Alltype 55.
Artline 2.0 389.
Calchword 149.
Cont Draw 2.0 389.
Deluxe Paint II Enhanced 89.
Designer 475.
Express Publisher 105.
Facelift 69.
First Publisher 99.
Fontasy 3 69.
Freedom Of The Press 259.
Graphics Composer 295.
Graphics Editor 395.
Grasp 4.0 205.
Image-In-Color Pro 469.
Multimedia Explorer 129.
OmniPage 386 Windows 469.
OmniPage 4.0 519.
PC Paintbrush IV + 125.
Pizazz + 75.
Printmaster Plus 45.
Printshop 45.
Publish It 2.0 149.
Publisher For Windows 139.
Publishers Powerpack 55.
Publishers Type Foundry 319.
Readright Windows 319.
Show Partner FX 229.
Soft Type 125.
Ultra Script PC Plus 259.
Ventura Gold 3.0 499.
Windows Draw 105.

EDUCATION/TRAINING

Auto Map 59.
Bodyworks 59.
French Assistant 49.
German Assistant 49.
Italian Assistant 49.
Knowledge Adventure 59.
Learning DOS 45.
Learning German 95.
Learning Spanish 95.
Orbits 39.
PC Bible Study 89.
Spanish Assistant 49.
Sports Adventure 49.
Teach Yourself Windows 3.0 35.

COMMUNICATION/NETWORKING

Blast Professional 89.
Carbon Copy + 6.0 119.
CD Session Windows 105.
Crosstalk Communicator 65.
Crosstalk Mk IV 145.
Crosstalk Windows 129.
Dynamac Asyncrous 159.
Fast Lynx 95.
Laplink Pro V. 4 95.
PC Anywhere IV 129.

PROCOMM PLUS 2.0

Smartcom Exec 75.
Smartterm 240 79.
Softterm PC 219.
Terminal + 129.
WinConnect 75.
WinFax Pro 69.
WinFax Pro 79.

DATABASE

Alpha Four V.2 Server 325.
Alpha Four V.2 Upgrd 109.
Ask Sam 5.0 229.
Clarion Personal 55.
Clarion Professional 489.
Clipper 5.01 529.
Codebase 4.5 299.
Data Perfect 2.2 295.
DB Fast Windows 355.
DBase IV 519.
DBase IV Developers 869.
DBXL 149.
Foxbase + 199.
Foxbase + 386 305.
Foxbase + Lan 305.
Foxbase + Lan Runtime 349.
Foxpro 2.0 489.
Foxpro 2.0 LAN 789.
Foxpro 2.0 Dist Kit 315.
Instant Database for Windows 55.
Nutsell-II 229.
Paradox 529.
Paradox Engin 99.
PC File 6.0 89.
Personal R Base 85.
Q & A 4.0 265.
R Base 3.1 479.
R&R Report Writer 155.
Reflex 179.
SCD Foxbase 659.
Superbase 4 439.
Thinix 319.
WindowBase 219.

DESKTOP PUBLISHING

Adobe Fonts 319.
Adobe Illustrator 129.
Adobe Plus Pak 136.
Adobe Streamline 75.
Adobe TypeAlign 69.
Adobe Type Manager 69.
Adobe TypeSets 1,2,3 69.
Alltype 55.
Artline 2.0 389.
Calchword 149.
Cont Draw 2.0 389.
Deluxe Paint II Enhanced 89.
Designer 475.
Express Publisher 105.
Facelift 69.
First Publisher 99.
Fontasy 3 69.
Freedom Of The Press 259.
Graphics Composer 295.
Graphics Editor 395.
Grasp 4.0 205.
Image-In-Color Pro 469.
Multimedia Explorer 129.
OmniPage 386 Windows 469.
OmniPage 4.0 519.
PC Paintbrush IV + 125.
Pizazz + 75.
Printmaster Plus 45.
Printshop 45.
Publish It 2.0 149.
Publisher For Windows 139.
Publishers Powerpack 55.
Publishers Type Foundry 319.
Readright Windows 319.
Show Partner FX 229.
Soft Type 125.
Ultra Script PC Plus 259.
Ventura Gold 3.0 499.
Windows Draw 105.

EDUCATION/TRAINING

Auto Map 59.
Bodyworks 59.
French Assistant 49.
German Assistant 49.
Italian Assistant 49.
Knowledge Adventure 59.
Learning DOS 45.
Learning German 95.
Learning Spanish 95.
Orbits 39.
PC Bible Study 89.
Spanish Assistant 49.
Sports Adventure 49.
Teach Yourself Windows 3.0 35.

COMMUNICATION/NETWORKING

Blast Professional 89.
Carbon Copy + 6.0 119.
CD Session Windows 105.
Crosstalk Communicator 65.
Crosstalk Mk IV 145.
Crosstalk Windows 129.
Dynamac Asyncrous 159.
Fast Lynx 95.
Laplink Pro V. 4 95.
PC Anywhere IV 129.

THE MIRACLE

Where is Carmen? 375.
39.
HARDWARE
AC Datalink 309.
Hayes ESP PS/2 265.
Hayes ESP AI/O 229.
Okidata Printers 229.
Optima 24 505.
Optima 96 V32 135.
Pocket Edition 2400 205.
Sound Blaster Pro 699.
Toshiba Laptops 699.
Ultra 96 699.

INFORMATION/PROJECT MANAGEMENT

ACT 2.1 235.
Address Book Plus 59.
Agenda 2.0 305.
BCIM 49.
BCIM For Windows 69.
Daybook Plus 45.
Desktop Set 3 95.
Grandview 205.
Harvard Project Manager 459.
Idea Fisher 359.
Info Select 2.0 99.
MaxThink 55.
Norton Desktop w/Game Pak 99.
On Target 275.
Plan Perfect 245.
Project Scheduler V 495.
SideKick 2.0 85.
Timeline 5.0 459.
WP Office 5 Pack 309.

INTEGRATED

First Choice 105.
Framework IV 485.
Lotus Works 105.
PFS: Window Works 139.
Smartware II 409.
Symphony 2.2 525.
Word Perfect Office 95.
Works For Windows 139.

KENSINGTON

Expert Mouse 109.
Keyboard Shelf 55.
Masterpiece+ 115.

MATHEMATICAL

Derive 159.
Mathematica 386 675.
Mathematica 386/387 755.
Mathcad Windows 319.
Math Type PC 169.
SPSS/PC + 179.
Statgraphics 5.0 635.
Systat 749.
Plot II 349.

MICROSOFT

MS Basic 7.1 339.
MS C Compiler 335.
MS Dos 3.3 or 4.01 69.
MS DOS 5.0 79.
MS DOS 5.0 Upgrade 89.
MS Excel 3.0 319.
MS Fortran 309.
MS Macro Assembler 109.
MS Mouse with Paint 115.
MS Mouse with Windows 165.
MS Multiplan 135.
MS Office Windows 499.
MS Powerpoint 329.
MS Project 339.
MS Project Windows 459.
MS Quick Basic 75.
MS Quick C 75.
MS Windows 3.0 99.
MS Windows Dev Toolkit 339.
MS Word 5.5 229.
MS Word Windows 329.

OPERATING SYSTEMS

Desqview 85.
Double DOS 139.
DR. DOS 6.0 49.
DR. DOS Multi-User 495.
MS DOS 5.0 135.
MS DOS 5.0 Upgrade 79.
OS/2 Pres Mgr Toolkit 339.
OS/2 Standard 145.
PC DOS 4.01 135.
PC DOS 5.0 155.
PC MOS 5 User 439.
Unix 386 Development 709.
Unix 386 Operating 709.

VM 386 Multi User

589.
Xenix 386 Operating 589.

PROGRAMMING

Actor 195.
Actor Professional 329.
Borland C++ 325.
Brief 185.
Clear + For C 135.
Objectvision 109.
Owl Guide/Windows 389.
Realizer 369.
Resource Toolkit 115.
RM Cobol 85 799.
Smalltalk V286 125.
Smalltalk VPM 299.
Smalltalk Windows 279.
Toolbook Windows 305.
Turbo C Tools 125.
Turbo Pascal 109.
Turbo Pascal Windows 169.
Turbo Professional 109.
UI Programmer 345.
Visual Basic 139.

SPREADSHEETS

Baler 105.
Lotus 123 ver. 2.3 349.
Lotus 123 V. 3.1+ 419.
MS Excel 3.0 319.
Quattro Pro SE 55.
Quattro Pro 3.0 319.
Quattro Pro 3.0 Upgrade 129.
Supercalc V 109.
Wingz PC 335.

UTILITIES

386 Max 6.0 69.
Above Disk 65.
After Dark 39.
Always 129.
Attitools 95.
Auto Menu 45.
Becker Tools 79.
Blue Max 6.0 85.
Check It 89.
Control Room 89.
Copy II PC 35.
Copywrite 65.
Cubit 39.
Direct Access 69.
Disk Manager 45.
Disk Technician Gold 99.
Fastback Plus 119.
First Apps 59.
Icon Designer 45.
Info Spotter 55.
Intelligent Back-Up 109.
K Edit 115.

MAGELLAN

Memory Commander 115.
Menu Works Adv 59.
MKS Toolkit 79.
MKS Toolkit 225.
Mover 59.
Nantucket Tools 489.
Netroom 89.
Norton Antivirus 89.
Norton Back-Up 95.
Norton Commander 99.
Norton Editor 75.
Norton Utilities 6.01 119.
Option Board Deluxe 119.
Optune 55.
PC Kwik Powerpack 79.
PC Tools Deluxe 7.1 109.
PK Zip 49.
PackRat 255.
Print A Plot 195.
Print Cliche 105.
Print Q 95.
Q Dos III 55.
QEMM 386 6.0 65.
DRAM 55.
Scrapbook+ 95.
Sideways 65.
Software Bridge 85.
SPF/PC 155.
Spinrite 89.
Stacker 89.
Turbo EMS 59.
V Feature Deluxe 85.
Virex PC 85.
Wide Angle 85.
Win Tools 119.
Windows Express 65.
Wonder Plus 55.
XTree Gold 2.5 99.

WORD PROCESSING

AmiPro 299.
AmiPro Upgrade 99.
Grammatik IV 65.
Just Write 89.
Letter Perfect 139.
Manuscript 339.
MS Word 229.
MS Word Windows 319.
Multimate 4.0 269.
Professional Write+ 175.
Rightwriter 5.0 59.
Typing Tutor V 39.
Word For Word Pro 79.
Word Perfect 5.1 269.
Word Perfect Windows 269.
Wordstar 6.0 225.
Writers Toolkit 89.



Plain Wrap Prices,
Black Tie Service.

20909 Ventura Blvd., Suite #13, Woodland Hills, CA 91364 (818) 710-9174

Call Toll Free from anywhere in the United States

Monday thru Friday - 6:00AM to 5:00PM PST

1-800-274-6611

Or Fax It!

1-818-884-5310

We will promptly replace any defective items returned within 30 days, but cannot guarantee compatibility. There is a 15% restocking fee on any non-defective, unopened goods, and all returns must be accompanied by a Returned Merchandise Authorization. Software prices do sometimes fluctuate beyond our control and may change, for better or worse, without notice. While ground shipments are free, we do ask \$11.00 per item for 2-day, \$22.00 per item for overnight, and \$4.50 for C.O.D. Although shipping heavier items may be slightly more, bulk orders can be a lot less. Free catalogues are available upon request, and please call us for any item not listed.

PC Magazine's Direct Marketing Connection for PC Products and Services



Most of you buy PC products and services through direct marketing channels. In fact, in a recent study of subscribers, 83% said they bought PC products from direct marketers.*

You buy direct because you know exactly what you need and you seek good value and fast delivery.

The following special section connects you with the direct marketers who are eager to please you. By having them all in one place, you can quickly zero in on what you need and which vendor you want to call.



JUST FOR BUYERS WHO MEAN BUSINESS.

WE ACCEPT PO'S
FROM QUALIFIED FIRMS

MEMORY

NO SURCHARGE
FOR MC, VISA & DISCOVER

★★ CALL TOLL-FREE 800-433-3726 ★★

★ HOT BOX ★

Everex Tempo LX; LX20,
Zeos 386SX Notebook, Sanyo 17/18
2Meg Modules — \$119.00
Cyrix Math Chip:
83D87-16DX, 2-3x faster than Intel — \$99.00
Zenith Z386/33, 33E, 25, 20:
ZA3800MK, 4Meg — \$189.00
1X36-80: 72 PIN SIMM 4Meg,
PS/2 Type Fits All Major Computers — \$189.00
Turbo 25: 150 fonts for HP Printers — \$99.00
PS/2: 34F2933 & 87F9977, 4Meg for
55SX, 65SX, 35SX, 40SX, 55LS, 35LS — \$175.00
We have memory for all laser printers.
(SEE BELOW)

Individual D-RAM Chips

MEMORY FOR IBM & APPLE				
	60NS	70NS	80NS	100NS
1Meg x 1	5.25	4.75	4.50	4.30
4Meg x 1	—	—	—	—
1Meg x 4	—	—	24.00	—
1Meg x 4 (Zip Pack)	—	—	24.00	—
256 x 4 (Video Zip)	—	—	—	14.95
256 x 4	6.00	5.50	5.25	5.55
256 x 1	2.65	2.30	1.90	1.65
64 x 4	—	—	3.25	—
64 x 1	—	—	—	1.50

SIMM MODULES (Add \$5* for SIPP)

	40NS	53NS	60NS	70NS	80NS	100NS
1Meg x 9 (IBM)	89.00	69.00	45.00	42.00	40.00	38.00
1Meg x 9 (Lo Power, Lo Refresh)	—	—	—	—	55.00	—
4Meg x 9 (IBM)	CALL	CALL	179.00	149.00	139.00	—
256 x 9 (IBM)	—	—	23.00	21.00	18.00	17.00
512 x 36 2Meg (72 PIN)	—	—	—	—	109.00	—
1 x 36 4Meg (72 PIN)	—	—	—	—	189.00	—
2 x 36 8Meg (72 PIN)	—	—	—	—	409.00	—
4 x 36 16Meg (72 PIN)	—	—	—	—	749.00	—

INTEL Math Chips

8087	59.00	80387-16	129.00
8087-2	79.00	80387-16SX	149.00
8087-1	139.00	80387-20SX	159.00
80287-XL	94.00	487-SX20	549.00
80287-XLT	109.00	80387-DX (NEW)	219.00

IIT ADVANCED MATH CO-PROCESSOR

• 2-3 times faster than Intel • Plug & object code compat w/Intel
• 5 Year 2C87-8MHz — 70.00 2C87-12 5MHz — 85.00
Warranty 2C87-10MHz — 75.00 2C87-20MHz — 99.00

CYRIX FASMATH PROCESSOR

• Programs executed up to 3X faster • Plug & object code compat w/Intel
• PC Week • rated #1 over all math chips
5 Year 83D87-16MHz — 99.00 83D87-33MHz — 189.00
Warranty 83D87-20MHz — 179.00 83S87-16SX Ver. — 119.00
83D87-25MHz — 179.00 83S87-20SX Ver. — 129.00
83D87-40MHz — 229.00 83S87-25SX Ver. — 149.00

AST MEMORY MODULES

MODEL#	AMT. UPGRADED	AST PART#	PRICE
Premium 386/25, 16 SX	1Meg	500718-001	65.00
Premium 386/33	1Meg	500718-002	69.00
Premium II	1Meg	500780-003 WPB	85.00
386SX20, 486-25, 25E, 33	4Meg	500780-004 WPB	179.00
Premium Tower, 386/33TE, 486/25TE, 486/33TE	8Meg	500780-001 WPB	360.00

ZENITH MEMORY UPGRADES

MODEL#	AMT. UPGRADED	ZENITH PART#	PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME	60.00
Z386/33, 25, 20, 33E	4Meg	ZA3800MK	189.00
Z248, Z286LP Z386SX	2Meg	Z-605-1 modules	109.00
Z486/33ET	4Meg	ZA-4200-M2	399.00
Z486/33ET	16Meg	ZA-4200-MB	849.00

BOCA AT PLUS

16 BIT MEMORY BOARD FOR 286, 386 AT
OK-8Meg Board • 4.0 LIM Compatible • New 5 Year Warranty
Conventional, Expanded and Extended Memory
Supports DOS, OS/2, LIM/EMS & EEMS
Versatile Split Memory Addressing
Operates with CPU Speeds to 33 MHz
Supports Desqview, Multitask operations
OK — \$109.00 2Meg — \$189.00 4Meg — \$269.00 8Meg — \$419.00
Board made by Boca Research, AT plus
BOCA AT PLUS I/O 1 par., 1 ser., 0-4 meg 129.00
BOCA AT I/O 44 2 ser. ports, 2 par. ports 69.00

BOCA XT 8 BIT BUS

• Expanded memory for XT • Lim 4.0 compat 0-2Meg • Uses 256x1 100
OK \$109.00 1Meg \$170.00 2Meg \$229.00

IBM PS/2 SIMM MODULES

IBM PART NO.	WORKS WITH MODEL NO.	L.A. TRADE'S COMPT. PRICE
30F5348 (512K)	30-286	35.00
30F5360 (2Meg)	30-286, 25-286, 50 MTHR BD.	99.00
6450375 (1Meg)	80-041	65.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	119.00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	219.00
6450603 (1Meg)	35SX, 40SX, 55SX, Model-70 s, P-70	51.00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	89.00
6450608 (2Meg)	70-A21, A-61, B-21, B-61, 35SX, 35LS, 40SX	104.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	175.00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	175.00
1057035 (512K)	P/S1	50.00
92F9935 (2Meg)	P/S1 & P/S1/386SX	109.00
92F9694 (4Meg)	P/S1 & P/S1/386SX	249.00
6450902 (2Meg)	57SX, 90, 95, P-75	99.00
6450128 (4Meg)	57SX, 90, 95, P-75	179.00
6450129 (8Meg)	35SX, 40SX	389.00
6450130 (8Meg)	57SX, 90, 95, P-75	399.00
79F0999 (2Meg)	LX40, N33SX	99.00
79F1000 (4Meg)	LX40, N33SX	179.00
79F1001 (8Meg)	LX40, N33SX	379.00

COMPAQ MEMORY MODULES

MODEL#	AMT. UPGRADED	COMPAQ PART#	PRICE
DeskPro 386/33, 386/33L	2Meg Module	115144-001	120.00
486/25, 486/33L	8Meg Module	116561-001	349.00
486/50L	32Meg Module	116568-001	1900.00
System Pro			
DeskPro 386/25, 386/20	1Meg Module	113131-001	75.00
	4Meg Module	113132-001	189.00
DeskPro 386S-16MHz	1Meg Exp Bd	113633-001	120.00
	4Meg Exp Bd	113634-001	259.00
	1Meg Module	113646-001	75.00
	4Meg Module	112534-001	199.00
DeskPro 386/20E	1Meg Exp Bd	113644-001	119.00
DeskPro 386/25E	4Meg Exp Bd	113645-001	259.00
	1Meg Module	113131-001	75.00
	4Meg Module	113132-001	189.00
DeskPro 286N, 386N,	1Meg Module	118688-001	64.00
386SX/20, 386/25M,	2Meg Module	118689-001	99.00
486/33M, 486S/25M,	4Meg Module	118690-001	189.00
486S/16M			
DeskPro 386/16	1Meg Kit	108071-001	119.00
	4Meg Kit	108072-001	269.00
	1-2Meg Exp Bd	108069-001	309.00
	4-8Meg Exp Bd	108070-001	549.00
DeskPro 286	512K Kit	113012-001	79.00

MEMORY UPGRADES FOR COMPAQ PORTABLES AND LAPTOPS

Portable 386	1Meg Kit	107651-001	169.00
	4Meg Exp Bd	107653-001	479.00
	4Meg Daght Bd	107654-001	479.00
Portable III	2Meg Kit	107332-001	119.00
Compaq SLT/286	1Meg Module	110235-001	119.00
	4Meg Module	110237-001	369.00
Compaq SLT/386	1Meg Module	118303-001	89.00
	2Meg Module	118304-001	139.00
	4Meg Module	118305-001	249.00
Compaq Lite 286	1Meg Bd	117081-001	79.00
	2Meg Bd	117081-002	119.00
	4Meg Bd	117081-003	219.00
Compaq Lite 386S/20	1Meg Module	121125-001	129.00
Compaq Lite 386S/20	4Meg Module	121125-002	299.00

NO SURCHARGE FOR MASTERCARD, VISA OR DISCOVER. PURCHASE
ORDERS ACCEPTED FROM FORTUNE 500, GOVERNMENT & INSTITU-
TIONS. Price & availability subject to change. California orders add 8.25%
sales tax. Returned orders or ordered wrong parts are subject to a 20%
restocking fee. (Memory chips not installed in boards.) We accept interna-
tional orders shipped via UPS Air, APO, FPO orders welcome. All credit
card charges verified for fraudulent use. SORRY, NO REFUNDS AFTER
30 DAYS — EXCHANGES ONLY. We accept MC, VISA, Discover, AE, prepaid
orders, purchase orders, wire transfer, COD (cashier's check) orders, cash &
cashier's checks. • ALL MANUFACTURE PART #S ARE FOR REFERENCE ONLY •

TOSHIBA LAPTOP MEMORY

LAPTOP MODEL #	AMT UPGRADED	TOSHIBA PART #	L.A. TRADE'S COMPT. PRICE
T1000SE/XE/LE	1 5Meg	PC14-PA8311U	129.00
T1000SE/XE/LE	2Meg	PC14-PA8312U	149.00
T2000/T2000SX	1Meg	PC18-PA8316U	114.00
T2000/T2000SX	2Meg	PC18-PA8317U	149.00
T2000SX/T1000LE	4Meg	PC-PA8314U	289.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	529.00
T2000SX/2200SX	2Meg	PC-PA2000U	149.00
T2000SX/2200SX	4Meg	PC-PA2001U	289.00
T2000SX/2200SX	8Meg	PC-PA2002U	529.00
T4400SX	2Meg	PC-PA2003U	249.00
T4400SX	4Meg	PC-PA2004U	349.00
T4400SX	8Meg	PC-PA2005U	799.00
T3300SL	2Meg	PC-PA2006U	219.00
T3300SL	4Meg	PC-PA2007U	379.00
T3300SL	6Meg	PC-PA2008U	549.00
T1200XE	2Meg	PC13-PA8306	109.00
T1600	2Meg	PC8-PA8302U	109.00
T3100	2Meg	PC3-PA7135E	299.00
T3100e	2Meg	PC9-PA8340U	109.00
T3100SX	2Meg	PC15-PA8308U	109.00
T3100SX	4Meg	PC15-PA8310U	189.00
T3200	3Meg	PC6-PA7137U	169.00
T3200SX	2Meg	PC12-PA8307U	114.00
T3200SX	4Meg	PC12-PA8909	179.00
T3200SX	2Meg	PC19-PA8318U	112.00
T3200SX	4Meg	PC19-PA8319U	189.00
T5100	2Meg	PC7-PA8301U	114.00
T5200/T8500	2Meg	PC10-PA8304U	114.00
T5200/T8500	8Meg	PC10-PA8313U	399.00

BRANDNAME LAPTOP MEMORY

Leading Edge D/LT 386SX	1Meg		119.00
Bondwell B310, Plus	1Meg	23050-09100	119.00
Bondwell B310V, SX	1Meg		149.00
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	119.00
NEC Prospeed 286, 386SX-16	4Meg	PC21-22	349.00
NEC Prospeed 386	2Meg	PC31-21	159.00
NEC Prospeed 386	8Meg	PC31-22	749.00
NEC Prospeed 386SX-20	1Meg	PC43-21	139.00
NEC Prospeed 386SX-20	4Meg	PC43-22	409.00
Sharp PC-6220	1Meg	CE 621B	119.00
Sharp 6640	2Meg		109.00
Ti Travelmate 2000	1Meg	2568034-0001	119.00
Ti Travelmate 3000	2Meg	2566996-1	109.00
Zeos 386SX Notebook	2Meg		119.00
Zenith Master Sport 386SX	2Meg	ZA-300-1	179.00
Zenith Master Sport SL, SLE	2Meg	ZA-4-4	159.00
Zenith Super Sport			
286, 286E	1Meg	ZA-180-66	109.00
286E, SX	2Meg	ZA-180-64	159.00
SX Alpha	2Meg	ZA-180-86	159.00
Everex Tempo LX, LX20	2Meg	PCA 00053-0001	119.00
Everex Tempo Carrier	2Meg	PWA 0884-A-J000	189.00
AST Notebook Prem Exec	4Meg	500814-003 386SX/20/25/25L	179.00
Sanyo 17/18 NB	2Meg	M8C-NBMEM2	119.00
Panasonic CF170, CF270	1Meg	CF-BA165	79.00
Epson NB3	4Meg	AB08511	219.00
Tandon	2Meg, 8Meg	NB386SX-20	139.00, 499.00
AT&T Safari NSX/20	2Meg, 4Meg	PEC 37650, 37651	189.00, 379.00
Packard Bell 386SX	1Meg, 4Meg	286, 386SX	109.00, 299.00
Magnavox Metals	1Meg, 4Meg	286, 386SX	109.00, 299.00

LASER PRINTER MEMORY UPGRADES

	1MEG	2MEG	4MEG	1MEG	2MEG	4MEG
HP 2.2D 3.3D 3P 2P 2P+	89	125	195	IBM Laser 4029	109	179
Panasonic 4410/4430	129	209	319	HP III Si	59	179
Panasonic 4420/4450	99	139	229	Panasonic 4455	—	169
Panasonic 4450	135	—	—	NEC 90, 290	—	169
Epson 6000, Action Lsr	—	139	209	QMS 410	129	179
Epson Action Laser II	CALL	CALL	CALL	TI XL/PS17/PS35	69	—
Toshiba Page Laser 6	—	139	209	Canon LBP4	179	239
Packard Bell PB9500	—	139	209	STAR LS04	129	179
Ok 400	119	169	—			
IBM Laser 4019, 4019E	89	135	189	DeskJet 500	(256K) 69.00	

H.P. COMPATIBLE FONT CARTRIDGE

DESKJET SOLUTION for DeskJet 500, DeskJet Plus, 92 fonts,
4.5 pt. to 30 pt. 149.00
IBM 4019, 4019E, FONT CARTRIDGE 209 Fonts 129.00
TURBO 25 Comparable to Pacific Data's 25 CARTRIDGES
IN ONE!™, 150 Fonts (works with Epson Action Laser II) 89.00
TURBOSCRIPT™ 47 Scalable Fonts in Any Point Size 199.00
TAX & FINANCE FOR IBM 4019, E 159.00
TAX & FINANCE CARTRIDGE 99.00
PRO-65 for Epson & Toshiba Laser Printers, 65 Fonts 129.00

MEMORY BOARDS

IBM Compatibles, Compaq & PS/2

★ WE WILL TRY TO MATCH OR BEAT ANY ADVERTISED PRICE ★
All products Brand New & Guaranteed • We Buy Excess Inventory
Trademarks are registered with their respective companies

L.A. TRADE
20930 South Normandie • Torrance, CA 90502

EVEREX

EV-3000, EV-159: 0-3Meg, 4.0 LIM compat • Uses 256x1 chips \$89.00
EV-8000, EV-178: 0-8Meg, 4.0 LIM compatible • Uses 1Megx1 chips
• Supports multi-tasking & DMA multi-tasking in hardware \$205.00

PS/2 MCA 0-8MEG EXPANSION BD.

0-8Meg Extended and/or Expanded Memory for all
IBM PS/2 Models 50, 50Z, 60, 55SX, 16 Bit, 4.0 LIM Compat.
OK — \$139.00 2Meg — \$221.00
4Meg — \$303.00 8Meg — \$467.00

PS/2 MCA 0-32MEG EXPANSION BD.

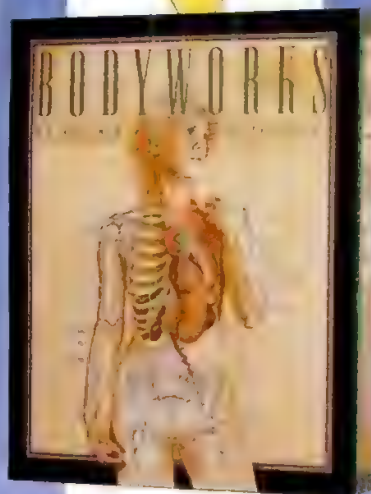
Boca BRMC-32 Extended - Expanded Memory Board for 32 Bit
P/S models 70, 80, 90, 95
0Meg — \$139.00 4Meg — \$299.00 8Meg — \$459.00
16Meg — \$735.00 32Meg — \$1311.00

310-782-2880 (previously CALL
FAX: 310-782-0240 area code 813) TOLL FREE

1-800-433-3726
(US and Canada)

ESTAB. Mon-Fri, 8:00 a.m. to 5:00 p.m. PST
1983 Sat. 10:00 a.m. to 12:00 noon

Retail \$79.95

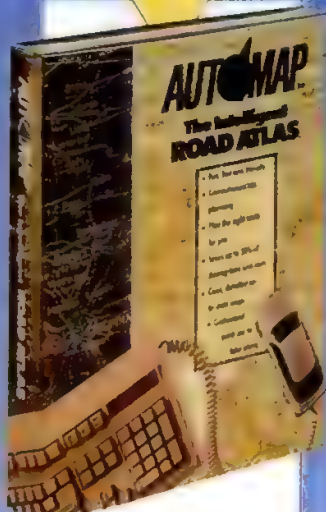
\$59

BY SOFTWARE MARKETING CORP.

The human body is the ultimate machine, and now you can explore its systems, structures and functions in fascinating detail. Bodyworks lets you focus on skeletal, muscular, nervous, digestive, cardiovascular, reproductive and other systems.

It also includes a Health Section with information on first aid, general fitness, sports injuries and common illness.

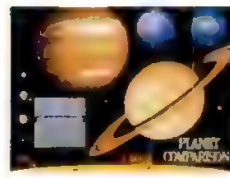
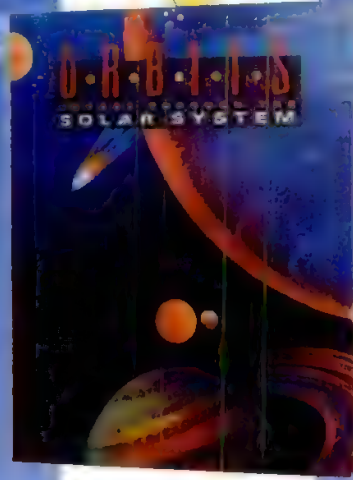
Retail \$99.95

\$59

BY AUTOMAP INC.

Clear, detailed maps that can get you anywhere in the United States. Just tell Automap where you are going, where you're starting from, what areas you'd like to visit (or avoid) and how you drive. View your entire journey in full color on the screen, or print out for easy reference. Its fast, fun and informative, plus it pays for itself in saved fuel and time.

Retail \$59.95

\$39

BY SOFTWARE MARKETING CORP.

An interactive space simulator and atlas of the solar system. Through colorful animation and 3-D graphics, you'll witness lunar and solar eclipses, follow the clockwork motion of the solar system and travel into the heart of the sun. Study actual satellite photographs and compare the planets. This exciting and educational trip into space is as near as your PC.

▶ LIMITED OFFER ♦ FIRST 1000 CUSTOMERS ◀

ALL 3 FOR ONLY \$139

▶ SAVE \$100. OVER 40% OFF RETAIL ◀

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*Free
Overnight
Shipping!*

Call Toll Free from anywhere in the United States
Monday thru Friday • 6:00AM to 5:00PM PST

1-800-274-6611

Plain Wrap Prices,
Black Tie Service.

Or FAX Your Order!

1-818-884-5310♦ **FREE OVERNIGHT SHIPPING** ♦ **NO CREDIT CARD SURCHARGES** ♦ **SAME DAY SHIPPING** ♦

20969 Ventura Blvd., Suite 13, Woodland Hills, CA 91364

CIRCLE 027 ON READER SERVICE CARD

MIDWEST COMPUTER WORKS

QUALITY SERVICE & GUARANTEED LOWEST PRICING!

LAPTOP COMPUTERS

AST Premium Exec 386 40/60/80MB	CALL
AST Premium Exec 386/25 80mb	NEW
Compaq LTE386 30MB/60MB	CALL
Everex Tempo LX 20/40/60MB	CALL
Everex Tempo Carner	NEW
Magnavox	ALL MODELS
Sharp PC6220 286 VGA 20MB	999
Texas Instruments TM2000	999
Texas Instruments TM3000	CALL
Texas Instruments 386/WINSX	NEW
Toshiba T2000SX 40MB	1849
Toshiba T2000SX 60MB	2629
Toshiba T2200SX 40MB/60MB	CALL
Toshiba T3200SX 120MB color	CALL
Toshiba T4400SX 80MB	NEW

COMPUTERS

AST Premium II 386SX/20 model 5	1319
AST Premium II 386/33 model 5	2399
Compaq Deskpro 386S/20 w/80MB	CALL
Compaq Deskpro 486/33M	CALL
Compaq SystemPro	ALL MODELS
DTK 286/386/486	custom quotes CALL
Packard Bell all models	CALL
Smith Corona	ALL MODELS
Wyse Terminals 30/50/60	294/375/298

DISK DRIVES

Conner 120MB IDE	379
Conner 210MB IDE	IN-STOCK
Conner 540MB IDE	1269
Maxtor	ALL MODELS
Microplus	ALL MODELS
Pacific Rim External floppy drives	CALL
Plus Hardcard II XL 50MB	298
Plus Hardcard II XL 105MB	437
Seagate ST251-1 40MB MFM	242
Seagate ST3096A 89mb 16ms IDE	299
Seagate ST3144A 130mb 16ms IDE	379
Seagate ST1239A 211mb 15ms IDE	595
Teac 3 1/2" & 5 1/4" floppies	CALL
Teac dual floppy drive	167
Toshiba 1 2MB / 1 44MB	69

MATH-CO-PROCESSORS

Cyrix 80387DX-20/25	149
Cyrix 80387DX-33	162
Intel 80287XL	85
Intel 80387SX-16	124
Intel 80387SX-20	134
Intel 80387DX-20/25/33	199
Wetek	ALL MODELS

MEMORY PRODUCTS

2MB for T1000SE/XE & T2000SX	269
2MB for T1 TM3000	199
1MB for Panasonic laser printers	CALL
1MB for Texas Instrmt laser printers	CALL
256x4 80ns DRAM	5 50
256x9 80ns SIMM	17 00
1MBx9 80ns SIMM	CALL
4MBx9 80ns SIMM	CALL

MICE

Logitech Dextra 2-button serial	49
Logitech Mouseman	79
Microsoft bus or serial 400 dpi	89
Microsoft mouse w/windows 3.0	149
Microsoft Ball Point mouse	125

PANASONIC

KXP1180 / 2180	149/179
KXP1123 / 2123	199/257
KXP1124	275
KXP1624	339
KXP1654	535
KXP2624	369
KXP4410 Laser	645
KXP4450 Laser	CALL
KXP4455 Laser	CALL

NEC

P3200 P3300	269/369
P6200 P6300	419/622
P9300	869
LC90 Postscript	1545
LC95 Postscript	NEW
Dicomate Postscript	4499

DICOMIX by Kodak

150+	329
180+	295
Color 4 inkjet	599
Dicomix carrying case	29

OKIDATA

184 Turbo	225
320/321	314 438
390+/391+	439/595
393+ Color	999
Laser 400	595
Laser 800	925
Laser 830	1308
Laser 840	1594

HEWLETT PACKARD

Deskjet 500	398
Deskjet 500C	NEW
Deskjet IIIP	828
Laserjet IIIP	CALL
Laserjet III	1529
Laserjet IIID	2327
Laserjet IIIS	SPECIAL

Paintjet

Paintjet	699
Paintjet XL	CALL
Scanjet+	IN STOCK
Scanjet 2C	NEW

IBM

Laserprinter 10-10L	CALL
IBM Execjet	699

CANON

BJ10EX Bubblejet	329
BJ300/330	449/599
We stock all Canon Acces	

STAR

NX1001	147
NX1020R Color	185
NX2420R Color	305
XB2420 Color	469
LaserPrinter 4	859

QUME

Crystal Express	CALL
-----------------	------

SEIKOSHA

SP 2400	165
LT 20/SL 90+	299/319

CITIZEN

GSX-140+ 145	299/399
PN48 notebook	299

QMS

410 Postscript	1499
815.815MR	2869/3905
825.825MR	3359/4625
Colorsript 10P	4859
Colorsript 10	5729

TEXAS INSTRUMENTS

Microlaser Basic	899
Microlaser Basic XL	2149
Microlaser PS17	1197
Microlaser PS35	1497
Microlaser XL PS17	2489
Microlaser XL PS35	2799

EPSON

FX-850	CALL
LQ-570	CALL
LQ-870	CALL
Action Laser II	NEW
DFX-5000	1389
DFX 8000	2229

SEIKO

Smart Label Printer	174
---------------------	-----

LASERJET ACC.

HP Paper Cassette Trays	IN-STOCK
Pacific Data 25-in-1 cartridge	257
Pacific Data memory boards	CALL
Pacific Data Pacific Page XL	CALL
Pacific Data Postscript cart HP III/IIIP	289
LASERJET CONSUMABLES	CALL

BATTERY BACKUPS

American Power BK400 desktop	178
American Power AP400 slimline	305
American Power AP600 slimline	433
American Power AP900 slimline	609
American Power Surge Arrest Plus	39
Tripp Lite BC500	217
Tripp Lite BC750	CALL
Tripp Lite Iso Bar 4	44

MODEMS

Cardinal 2400 baud int MNP 5	99
Calpak 2496 send/rec fax modem	139
Intel Satisfaction Board	IN-STOCK
Intel 9600E external	CALL
Megahertz modems for all laptops	CALL
Practical Peripherals 9600SA	475
US Robotics Courier 2400 MNP 5	279
Worldport Fax/Modems for laptops	CALL
Zoom V 42 bis w mnp external	129

CD-ROM DRIVES

NEC CDR-36M portable	386
NEC CDR 73M external	599
Toshiba	ALL MODELS
Sony CDU 535 internal	349
Sony External CD-ROM	CALL

SOFTWARE

Adobe Type Manager	59
Adobe Illustrator	305
Aldus Pagemaker 4.0	489
Borland Quattro Pro	304
Caere Omnipage	449
Calera WordScan Plus	649
Calera Faxgrabber	99
Central Point PC Tools 7.01	119
Corel Draw 2.0	359
Delrina Winfaxpro	79
DMA PC Anywhere IV	99
Lotus 1 2 3 ver 3.1	399
Microsoft Office for Windows	489
Microsoft Windows 3.0	99
Microsoft Word for Windows	299
Symantec Norton Desktop	95
Stack Elec Stackler	89
Word Perfect 5.1	249

OVER 1000 TITLES IN STOCK!

PLOTTERS & DIGITIZERS

Calcomp 12x12 12x18	297/597
Hewlett Packard HP7440	CALL
Kurta 12x12 KLP 12x17 IS one	287/537
Summagraphics 12x12 12x18	312/549

TAPE BACKUP

Colorado DJ-10 40-120MB int	195
Colorado DJ-20 120-250MB int	252
Colorado OFA-700 250-700MB int	705
Inwin A120PC 40-120MB int	237
Inwin A250PC 250MB int	297
Maynard LX5540 40MB	249
Maynard VP150i	869
Mountain 40MB int/ext	249/CALL
Mountain FS8000 int	519

MISC

Soundblaster Pro	199
Keyboards XT AT	69
Printer stands (all dot matrix)	9 95

SCANNERS

Complete PC page scanner & Wordscan	559
Hewlett Packard Scanjet+ 2C color	CALL
Intel Satisfaction board scanner	279
Logitech Scanman 256 w/perceive	319
Microtek Scanmaker 600G	849
Microtek Scanmaker 600Z	1329

MONITORS

Goldstar 1460+ 14" 1024x768 28mm	299
Idek MF5117 17" 1024x768	999
Idek MF5217 17" 1024x768 26mm	1049
Mitsubishi HL6605 16" 1024x768	959
Mitsubishi HL6945 20" 1280x1024	1785
Nanao 9070U 16" 1024x768 28mm	939
Nanao 9080U 16" 1280x1024	1099
Nanao T560U 17" 1280x1024 26mm	1999
NEC 5D 20" multisync 1280x1024	1969
NEC 3FGX 15" 1024x768 28mm	CALL
NEC 4FG 15" 1024x768 28mm	749
NEC 5FG 17" 1280x1024 28mm	CALL
NEC 6FG 21" 1280x1024 28mm	CALL
Packard Bell 8539 14" 640x480 39mm	229
Panasonic C-1381 14" 1024x768	339
Panasonic C-1395 14" 1024x768	469
Princeton Ultra-1200 Ultra-1400	CALL
Samsung ML 4571 14" mono VGA	129
Samsung Sync4 17" 1024x768	STOCK
Seiko 1440/1450 14" VGA 25mm	485/589
Seiko 1760 17" 1280x1024 25mm	1249
Seiko 2050 20" 1024x768 31mm	1919
Sony CPD1304 14" 1024x768 25mm	579
Sony CPD1604S 17" 1024x768 25mm	NEW
Zenith 1492 14" flat tension VGA	CALL

VIDEO BOARDS

ATI VGA Wonder XL w/mouse 512K	175
ATI VGA Wonder XL w/mouse 1MB	190
ATI8514 Ultra1MB	CALL
ATI Vantage 512k 1MB w/mouse	CALL
ATI Graphics Ultra 1MB w/mouse	434
Boca SVGA 1024x768 512k 1MB	129/149
Cardinal-700 1024x768 512K 1MB	138/159
Diamond Stealth Hi-Color	CALL
Hercules Gold series	CALL
NEC Graphics Engine 16-256	595/889
Orchid Pro Designer IIs 1MB	219
Orchid Farenheit 1280	325
Paradise 8514 A+	469
Video 7 1024x256K 512K	129/149

NETWORKING

3COM 3C503 Etherlink	189
Digiboard	ALL MODELS
Lanlastic Ethernet Starter Kit	469
Netware 2 2.5-user	482
Netware 2 2.50-user	1945
Netware 3 11.5-user	599
Netware 3 11.10-user	1369
Netware 3 11.20-user	1889
Netware 3 11.50-user	2699
Netware 3 11.100-user	3660
Netware 3 11.250-user	6999
Netware Lite (peer to peer)	NEW
NE1000-NE2000 Boards	135/159
SMC Arcnet PC130-270E	98/124
SMC Arcnet PC600WS/PC600FS	129/208
Tiara 0111 0105	79/139
Thomas Conrad 6245 Arcnet 16-bit	209
Western Digital Elite Elite16	145/169
Xircom pocket lan adapters	CALL

FAX MACHINES

Canon Faxphone 24	745
Panasonic UF300 plain paper	1499
Sharp FO240	659

WIDE SELECTION
Huge inventory. Thousands of items in stock and ready for immediate shipment!

ON-TIME
In-stock orders are shipped the same day. We are fast & efficient.

RELIABILITY
We earn your business! Over 70% of our orders are repeat customers.

KNOWLEDGEABLE
All of our salespeople are technically trained to provide you with the right solution!

SERVICE
If you don't find it, ask. Our friendly staff will special order products for you!

SMITH CORONA Acer
386SX/20 80MB
•386SX 20MHz 2MB-RAM
•3 1/2" & 5 1/4" floppies
•80mb 17ms hard drive
•2 serial 1 parallel ports
•MS-DOS 5.0 Pre-installed
•FREE Microsoft Works
•FREE Logitech mouse
•1-year on-site warranty
\$949

SMITH CORONA Acer
386SX/20 120MB
•386SX 20MHz 2MB-RAM
•3 1/2" & 5 1/4" floppies
•120mb 17ms hard drive
•MS-DOS 5.0 Pre-installed
•FREE FAX Modem
•FREE Microsoft Windows 3.0
•FREE Microsoft Works
•FREE mouse & Prodigy
•1 year on-site warranty
\$1149

AST
PREMIUM EXEC 386SX 25MHz
•386SX 25MHz 4MB RAM
•Expandable to 8MB RAM
•1 44MB built-in floppy
•60mb or 80mb hard drive
•VGA white LCD (color optional)
•1-ser, 1-par VGA mouse or keyboard ports
•6.5" 9"D x 11.4"W x 2.2"H
NOW IN STOCK!

TEXAS INSTRUMENTS
TM3000
•386SX 20MHz 2MB RAM
•Expandable to 6MB RAM
•1 44MB built-in floppy
•20MB HD (30 40 60 or 80 opt)
•VGA paper-white display
•1 ser 1 par VGA mouse & numeric keypad ports
•5.7" 8.5"D x 11"W x 1.8"H
\$1799

TOSHIBA
T2000SX
•386SX 16MHz 1MB RAM
•Expandable to 9MB RAM
•1 44MB built-in floppy
•40MB HD (60MB opt)
•VGA LCD w/ 16 grey scale
•1-ser 1-par VGA keypad & keyboard ports
•6.9" 10"D x 12.2"W x 1.9"H
\$1849

Panasonic
Office Automation
KXP-1124I
24-PIN DOT MATRIX PRINTER
•New EZ set LCD operator panel
•300cps draft print speed w/12K buffer
•Front, rear, top or bottom paper feed
•Push and pull tractor
•Auto paper parking & loading feature
•Emulates Epson & IBM
•2-year Panasonic Warranty

KXP-2624
24-PIN WIDE CARRIAGE PRINTER
•New "Super Quiet Operation" (43.5dB)
•Fast 300cps draft print speed w/26K buffer
•Front, rear, top or bottom paper feed
•Push and pull tractor
•Auto paper parking & loading feature
•Emulates Epson & IBM
•2-year Panasonic Warranty

C-1395
14" 1024 x 768 COLOR MONITOR
•14" non-glare display w/ tilt swivel base
•Crisp 28mm dot pitch
•Non-interlaced for flicker free viewing
•Compatible with MCGA VGA XGA SVGA
•8514 A and Macintosh II
•Horizontal scan rate 30 to 57kHz
•Vertical scan rate 50 to 90Hz

KXP-4410
PERSONAL LASER PRINTER
•5 pages per minute
•One 200 sheet tray w/ manual feed
•300 x 300 dpi resolution
•512K RAM (max 4 5MB)
•HP IIIP emulation
•28 internal fonts
•1-year warranty

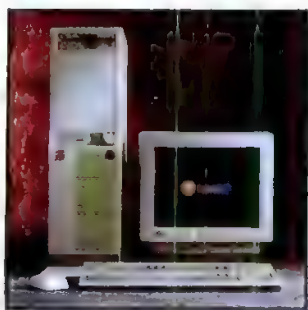
KXP-4450I
LASER PRINTER
•Fast 11 pages per min at 300 dpi
•Two 250 sheet trays
•Individual sheet loading
•512K RAM (max 4 5MB)
•HP & Epson emulation
•28 internal fonts
•1-year warranty

MIDWEST COMPUTER WORKS
350 Lexington Drive Buffalo Grove IL 60089

800-85-WORKS
(9 6 7 5 7)
TECH SUPPORT & CUSTOMER SERVICE 708-459-6883 • FAX 708-459-6933
WE GUARANTEE THE LOWEST PRICES AND THE BEST SERVICE!

• C D orders accepted
• Your credit card is not charged until the product is shipped
• Personal and company checks will delay order 2 weeks
• Call us for quantity discounts
• Prices subject to change
• We check for stolen credit cards
• Prices reflect a cash discount
• Foreign orders are welcome

Tangent has all the right pieces.

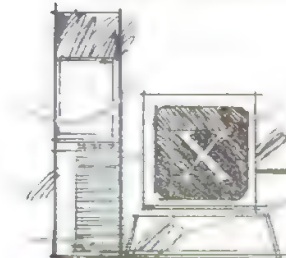


Model 433e

BLISTERING EISA PERFORMANCE

- 33MHz i486 (50MHz Now Shipping!)
- 32-Bit EISA bus for I/O-intensive applications
- 4MB RAM (Expandable to 64MB)
- Hi-speed 100MB SCSI caching disk subsystem
31 times faster than ordinary subsystems!
- DOS, Windows, Mouse, 1024x768 NI monitor

STARTING AT **\$4,395**

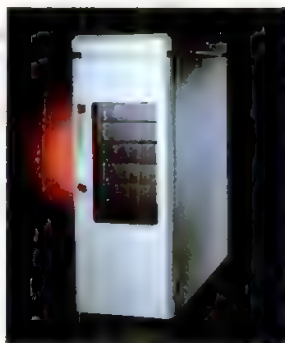
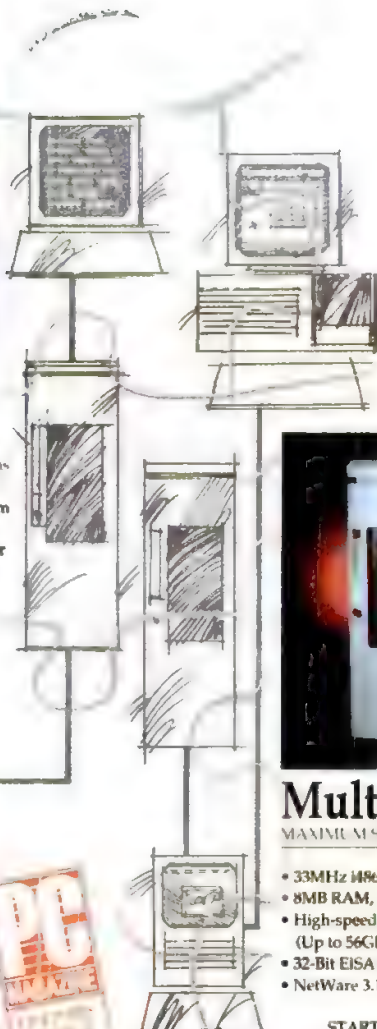


Model 340

MORE 386 POWER FOR HOME OR OFFICE

- 40MHz Am386 - faster than 486-20sx
- 4MB RAM, 100MB hard disk
- Tangent Graphics Accelerator -
Runs Windows Five Times Faster!
- 14" Non-interlaced 1024x768 VESA monitor
- MS-DOS 5.0, Windows 3.0, Mouse

STARTING AT **\$2,345**



Multi-Server™

MAXIMUM SERVER PERFORMANCE

- 33MHz i486 (50MHz Now Shipping!)
- 8MB RAM, expandable to 64MB
- High-speed 400 MB disk array
(Up to 56GB disk arrays available)
- 32-Bit EISA Ethernet adapter
- NetWare 3.11 or SCO UNIX available

STARTING AT **\$9,995**

The High Performance Question

Puzzled about what systems are best? Tangent computers give you all the right pieces. EISA superiority. The fastest hard disk subsystems. Stunning graphics. Rock-solid reliability. You always get the latest technology innovations ... at prices the competition can't touch.

The Customer Service Answer

The company behind the computers is just as impressive. Knowledgeable sales engineers, technical services staff plus UNIX and NetWare experts take care of your needs every step of the way. A 30-day money back guarantee and on-site service provided by TRW combine to make certain that with Tangent, you're well connected.

Putting It All Together

Whether it's a single Windows workstation, a complete multi-platform network, or anything in between ... Tangent has all the right pieces and the expert know-how to put them all together. Join the ranks of over 20,000 satisfied Tangent system owners. Don't be puzzled. Buy Tangent.

	386SX 20/25 MHz	386DX 33 MHz	386DX 40 MHz	486DX 33 MHz ISA	486DX 50 MHz ISA	486DX 33 MHz EISA (1 MB SCSI Cache Opt)	486DX 50 MHz EISA (1 MB SCSI Cache Opt)
4 MB RAM 100 MB Hard Disk Graphics Accelerator	\$1,995	\$2,295	\$2,345	\$2,595	\$3,495	\$4,395	\$5,395
8 MB RAM 200 MB Hard Disk Graphics Accelerator	\$2,695	\$2,995	\$3,045	\$3,295	\$4,195	\$5,095	\$6,095

CALL TODAY!

1-800-223-6677

TOLL FREE

Corporate Purchase Orders Welcome

GSA# GS00K91AGSS212

197 Airport Boulevard, Burlingame, CA 94010
Phone 415-342-9388 • Fax 415-342-9380



TANGENT
COMPUTER

You Always Win With Tangent.

6 TIMES PC MAGAZINE EDITORS' CHOICE!



Feb 11, 1992
Model 433e



Jan 14, 1992
Model 340



June 25, 1991
Model 425e



April 16, 1991
Model 433e



Nov. 1991
Model 340



Sep. 1991
Model 420s



Tangent Multi-Server 433e



Tangent Multi-Server 433e



Tangent Multi-Server 433e



Tangent Multi-Server 433e



Tangent Multi-Server 433e



Tangent Multi-Server 433e



Laser Printers Are Our Specialty!

WE KNOW WHAT WE SELL!
systems

OVER 20,000 SATISFIED CUSTOMERS

- HIGH RESOLUTION PRINTING
- PRINTER SHARING
- POSTSCRIPT
- PLAIN PAPER FAX DEVICES
- HIGH VOLUME PRINTING
- FULL LINE OF MEMORY UPGRADES
- CARTRIDGE CUSTOMIZATION
- FULL TECHNICAL SUPPORT

HIGH RESOLUTION PRINTING

LaserMaster WinJet 800, high resolution (800dpi), fastest speed PostScript solution for Windows 3.X. for LaserJet II/III
\$795.00

POSTSCRIPT ENHANCEMENTS

LII only
Adobe PS + FREE Type Cartridge 1 or 2 **\$238**
Pacific Page II and II/XL (New) **CALL**

POSTSCRIPT ENHANCEMENTS

LII/II/III
Pacific Page P.E. **\$319**
P.E. for Macintosh **\$469**
P.E. XL High Speed with 2MB/4MB **CALL**
UDP TurboScript Cartridge **\$249**

FONT CARTRIDGES/SOFTFONTS

Pacific Data	
25 in One	Lowest Price
Complete Font Library (PCL5)	\$259
IQ Engineering	
SC2/SC3 (PCL5)	CALL
UDP	
Turbo 25	\$149
Misc. Fonts	
Fonts on the Fly	\$99
Complete Adobe Fonts Collection	CALL

MEMORY UPGRADES

Available for most Laser Printers!
Every board pre-tested
with lifetime warranty.

PRINTER SHARING DEVICES

Laserplex
Family of plug-in devices for various laser printers.
256K memory standard upgradable to 1.25MB at 115K baud.
Model 50 - 4 ser., 1 par. **\$285**
Model 80 - 8 serial **\$365**
ASP ST 1200 - 12 serial to 4MB **CALL**
Logical Connection **CALL**
Buffalo Box-8 in/2 out par./ser., 1 par. **CALL**

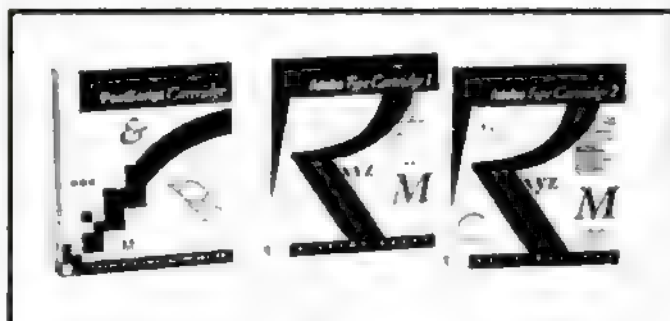
MISC HARDWARE & SOFTWARE

Letter/Legal Tray	\$59
Envelope Tray	\$72
Lower Cassette for LaserJet IIP/IIIP	\$137
Large Capacity Feeder	
1500 Sheet Feeder	\$469
250 Envelope Feeder	CALL
JetFax2 Stand Alone Plain Paper Fax (1 MB)	\$695
ASAP - Automatic, Phone/Fax/Modem Switch	\$105

DESKJET+/500/500C

Memory upgrades and variety of Multi-Font cartridges available.

YET
ANOTHER REASON
TO
Upgrade
YOUR LASERJET® II
TO
POSTSCRIPT®

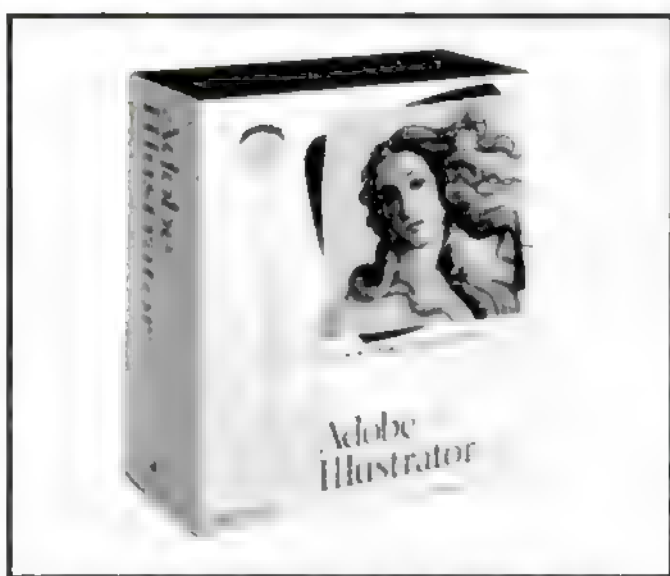


Both for **\$238** A \$744 Value.
HP LaserJet II PostScript Cartridge from
Adobe plus an Adobe Type Cartridge
with up to 19 fonts



Adobe Illustrator™ 4.0 For Windows

Adobe Illustrator™ 4.0 software for Windows "provides a professional illustration solution for the PC environment." This new version of the program allows graphic artists, designers and desktop publishers to create professional quality illustration and design. The new release offers an exceptional value. In addition to the Adobe Illustrator™ 4.0 program, the retail package includes Adobe Type Manager® (ATM), 40 Type 1 scalable fonts, the Adobe TypeAlign® type manipulation program, Adobe Separator™ color separation software and a generous selection of Adobe patterns,



Adobe Illustrator™ 4.0/Windows
\$419

textures, symbols, and borders. If you act now, you will also receive Adobe Streamline® when you purchase Adobe Illustrator™ 4.0. Adobe Illustrator™ 4.0 software for the Windows environment incorporates all the features of the Macintosh version and provides a number of key new features. Illustrator™ 4.0 offers edit in preview, on screen text, easier interface, resizable toolbox, powerful graphing tool, 24-bit color support and major performance enhancements.

CALL THE LASER
PRINTER SPECIALIST
1-800-747-HPLJ

(1-800-747-4755)
Call for your FREE DH Systems Product Guide
1940 Cotner Avenue • Los Angeles, CA 90025
Phone: (310) 479-4477 • Fax: (310) 478-4770

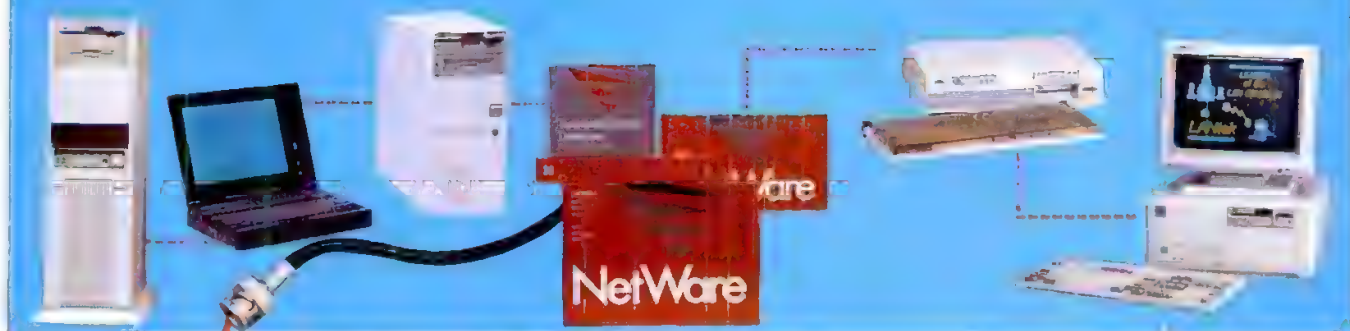


Adobe, the Adobe Logo, PostScript, ATM, Adobe Illustrator, Adobe Type Manager, Adobe Streamline and Adobe TypeAlign are trademarks registered in the USA and other countries, and Adobe Separator is a trademark of Adobe Systems Incorporated. Windows is a trademark of Microsoft Corporation.

NO SURCHARGE FOR CREDIT CARDS - IMMEDIATE SHIPMENT ON APPROVED PURCHASE ORDERS - 30 DAY MONEY BACK GUARANTEE. Except for opened software. Does not include return freight or shipping or handling. All returned merchandise must be accompanied by a return material authorization (RMA) number. Prices are subject to change without notice. VISA/MasterCard ACCEPTED



CIRCLE 125 ON READER SERVICE CARD



LANtek Makes Networking Simple As 1.2.3.

Experience and Expertise

Whether you are creating your first network or are enhancing an existing one, LANtek is the place to call. Our experience with Local and Wide Area Networks spans over 6 years. We can design and custom configure the Network that will serve your business today - with an eye towards growth in the future.

Factory-Direct

When you buy from LANtek, you are buying factory-direct, so there's no middleman. You get the quality, reliability, and features you want, at a substantial saving.

Plug and Play

Our LANs come pre-configured the way you wanted. All you have to do is connect the cable and you have got a LAN that is ready to fly.

Services and Support

Our service to you doesn't stop at delivery. LANtek provides on-line modem support from our staff of knowledgeable CNE technicians. Or you can call our Emergency Customer Support Center and receive responsive, sophisticated on-line, or on-site network support.

Warranty and Guarantee

At LANtek we use only the best components, we proudly offer all products with an unbeatable life time warranty on labor. All LANtek Token Ring and Ethernet networking interface card carry life time warranty on parts also. The rest carry 1 year on parts. We stand by our products with a 30 day money back guarantee.

Reliability and Quality:

Pull the cover off any LANtek file server or work station and look around. You will see names like Intel, Motorola, UltraStor, Conner, Micropolis, Teac, Novell, Western Digital, etc. on the system board, drives, and interface cards. We don't just build computers. We build value. Quality costs customers and us less in the long run. And we want to be your computer company for a long time to come.

**Complete 286-16 ARCnet
Diskless Workstation**

\$495.00

Standard Configuration:

- Intel Processor
- 1 MB 80ns or Faster RAM memory
- Expandable to 16/64 MB of system RAM
- DFI 2 serial, 1 parallel, 1 game port
- Teac 1.2M or 1.4M floppy disk drive
- Math Co-processor socket
- Focus 2001 101-key enhanced keyboard
- DFI IDE dual floppy and hard drive controller
- 200+W CSA, UL, TUV approved power supply
- Samsung Amber Monitor and card

SYSTEM PRICE CHART

MONO VGA ADD \$100, SVGA ADD \$335

LANtek	Conner			Micropolis 5 yr Warranty	
	40MB	120MB	200MB	345MB	650MB
486 33	\$1,619	\$1,823	\$2,079	\$2,735	\$3,108
486 SX	\$1,417	\$1,621	\$1,877	\$2,533	\$2,907
386 40	\$1,231	\$1,435	\$1,691	\$2,347	\$2,720
386 25	\$1,008	\$1,212	\$1,468	\$2,124	\$2,497
386 SX	\$892	\$1,096	\$1,352	\$2,008	\$2,381

NETWORKING

Novell NetWare	\$ Call
Artisoft LANtastic NOS	\$ 75
Novell Certified ARCnet 8 bit card	\$ 65
Novell Certified ARCnet 16 bit card	\$ 95
LANtek ARCnet Pocket Adaptor	\$ 195
Thomas Conrad 100Mbps ARCnet Card	\$1095
LANtek ARCnet 8 Port Active Hub	\$ 175
LANtek ARCnet Passive Hub	\$ 29
Novell Certified Ethernet 8 bit Card	\$ 119
Novell Certified Ethernet 16 bit Card	\$ 149
Western Digital EtherCard Plus 16-bit	\$ 179
LANtek Ethernet Pocket Adaptor	\$ 245
LANtek Ethernet 16 bit 10base T Card	\$ 179

LANtek Ethernet 8 bit 10base T Card	\$ 149
LANtek 12 port 10base T Concentrator	\$ 695
LANtek 8 port 10base T Concentrator	\$ 495
SynOptics 504 st Fiber Optic Transceiver	\$ 495
3Com 3C503 EtherLink II Card	\$ 225
Proteon Token Ring products	\$ Call
LANtek 16 bit 16.4 Mbps Token Ring	\$ 395
LANtek Token Ring 8 Port MAU	\$ 395
American Power 520VA (360W) UPS	\$ 365
American Power UPS Monitor Card Cable	\$ 85
Colorado 250MB Tape Backup Drive	\$ 325
LAN Modem Sharing Software	\$ 295
LAN 9600 Fax Sharing Hardware & Software	\$ 895

**TESTED AND
APPROVED**
NetWare Compatible

Contact the vendor of this product for
configurations tested and approved

122 East 1700 South, Provo, Utah 84601

NOVELL



NOVELL
Gold
Authorized
Dealer

We're Novell Gold Authorized Dealer, all of our computer systems are 100% compatible with Novell, NetWare, and more. Our technical staff can help you plan and equip your network system, including all necessary hardware and software.

TO ORDER CALL: 1 (800) 462-0436

- **Technical Support/General Information:**
(714) 594-9491
- **Fax Order:** (714) 594-6490
- **SALES HOURS:** Mon thru Fri: 8 a.m. to 6 p.m.
- Pricing is subject to change without notice.

LANtek Computer, Inc.
661 Brea Canyon Road, Ste #3, Walnut, CA 91789

- **30 Day Money Back Guarantee**
(Excluding shipping & software)
- We accept VISA, MasterCard, COD or Purchase Order with approved credit.
- Corporate, Government, and Dealer Accounts Welcome.

All systems are fully compatible with MS-DOS, OS/2, NOVELL, XENIX, and Pick. NetWare are sold in California. All companies and product names are trademarks of their respective companies.

MS-DOS 5 A self-paced introduction to DOS 5. This book features the DOS 5 Shell. It teaches simple techniques for organizing files, running applications and managing a hard disk.	15	PC Mag Guide to Windows 2D Press Running Windows: Microsoft Windows 3.0 Beyond the Basics Windows 3.0 QuickStart—Que X	19 30 15 15	Office guide to ProWord 4 PC Computing Guide to Quicken	19 19	PC Mag Network Tech & Utilities Understanding Norton Desktop	20 20	standard fonts all works with all	20 20
DOS BOOKS ABC's of DOS 5. Sybex X DOS 5 Instant Rel. Sybex Getting Started with DOS 5—Microsoft X Mastering DOS 5. Sybex PC Mag DOS 5.0 Tech & Utilities PC Mag Guide to DOS 5. 2D Press Que's MS DOS 5.0 User's Guide Running MS DOS 5. Microsoft Supercharging MS DOS 5. Microsoft	15 15 18 23 30 30 35 19 19	WORD PROCESSING BOOKS ABC's of WordPerfect 5.1 (DOS) at ABC 5.0 WordPerfect Windows at Mastering Am Pro 2. Sybex Mastering WordPerfect 5.1 (DOS) Mastering WordPerfect Windows Mastering Word for Windows 2.0 PC Mag Guide to AmPro 2D Press PC Mag Guide to Write Pro Plus PC Mag Guide to Word for Windows Running Word 5.5 Running Word for Windows—Microsoft Using WordPerfect 5.1 WordPerfect Windows Quickstart—Que X Word for Windows Companion—MS	15 20 21 21 21 19 19 19 21 21 21	Using WordPerfect for Windows The perfect introduction for WP. With this text cover all basic concepts and sophisticated features. This complete tutorial & reference is ideal for all levels.	21	LANGUAGE & DATABASE BOOKS GW Basic: Users Guide & Reference Learn C Now—Microsoft X Mastering FoxPro 2. Sybex Mastering Paradox 3.5. Sybex Mastering QuattroBasic 4.5. Sybex PC Mag 1. Pascal 6.0 Tech & Utilities PC Mag Basic: Tech & Utilities Running dBase. Microsoft QuickBasic Book—Microsoft Understanding Visual Basic 1.1. Sybex Understanding Clipper 5.01. Sybex Using Paradox 3.5. Que Using Borland C++ Que Using dBase. Que X-Books ideal for beginning users	15 15 22 22 26 26 26 19 19 22 22 22	Panasonic KXP1180 9 Pin 149 KXP2180 Quiet 9 Pin/Color option..... 179/\$95 KXP1123 24 Pin 199 KXP2123 Quiet 24 Pin/Color option..... 259/\$95 KXP1244 High Speed 24 Pin 279 KXP1624 24 Pin Wide 339 KXP2624 High Speed Quiet 24 Pin 339 KXP4410 4430 Laser 649/Cali KXP4450i Laser 1069 KXP4555 Laser 1699	
SPEADSHEET BOOKS ABC's of 1.23 3. Sybex X ABC's of 1.23 Windows X Mastering Excel 3.0. Sybex PC Mag Guide to Quattro Pro 3.0 PC Mag Guide to 1.23 Release 2.3 PC Mag Guide to 1.23 for Windows PC Computing Guide to Excel 3.0 Quattro Pro 3 Companion—Microsoft Running Excel 3.0 Understanding 1.23 Release 2.3 Using Excel 3.0—Que	15 15 21 19 19 19 19 19 19 21	PC Magazine Guide to 1.23 Rel. 2.3 \$19 Self-paced tutorials lead 100% of users through the program. Icons demonstrate the management of addressing ranges, formulas and statistical design. Also covers macros and statistics.	15 15 19	PUBLISHING & GRAPHICS BOOKS ABC 5.0 AutoCAD 11 X PC Computing Guide to Harvard Graphics for Windows Mastering AutoCAD 11. Sybex Mastering CorelDRAW 2. Sybex Mastering Harvard Graphics 3. (DOS) Mastering Harvard Graphics Windows Mastering PageMaker 4. Sybex Using PageMaker 4. Que Venturi Publisher for Win/Guide MS	17 17 19 22 22 22 22 22 22 22	Running Excel \$21 Packed with examples, tutorials and authoritative tips, book features step-by-step instructions backed by detailed text. Also information covers from the basic through advanced features.	21	QMS PS415 Seiko Smart Label Printer Plus 139 Star NX1001 139 NX2410 / 2415 189 / 369 Texas Instruments Microlaser PS17 1199 Microlaser PS35 1499 Microlaser PS35 Turbo 1999	

DATABASE & FORMS

askSam 5.0	209
Clarion Personal Developer	45
Clarion Professional Developer 3.0	449
Clipper 5.01	489
DataEase	509
dBase III+	419
dBase IV 1.5	449
dBXL Diamond	129
Formbase	299
FormTool Gold	52
Formfiller	79
Foxbase Plus	179
FoxPro 2.0	449
Paradox 3.5	469
Paradox Competitive Upgrade	165
Paradox SE	65
Per Form Designer & Filler	89
Personal Rbase	69
Q & A 4.0	249
RapidFile	189
Rbase for DOS	447
Reflex	159

ENTERTAINMENT

AutoMap \$49

Whether you're planning the quickest, shortest or most scenic route, AutoMap can layout the desired course of travel. This colorful road atlas for PCs has simple to read map displays and easy to follow instructions. Forest thimble with fold out maps - just tell AutoMap where you're starting from and where you want to go.



BodyWorks/Orbits	39/29
Carmen San Diego Deluxe Edition	45
F-19 Stealth Fighter	38
Facilon 3.0	45
King's Quest 5 (VGA Vers.)	38
Leisure Suit Larry V	39
Microsoft Flight Simulator	38
Aircraft & Scenery Designer	27
PC Globe or PC USA	35
Simcity or Simcity for Windows	28
SimEarth	39
Wing Commander I/II	39/45

DESKTOP PUBLISHING

Adobe Postscript Cart. for HPLJ-II	239
Bannermania	21
Express Publisher	Call
Microsoft Publisher for Windows	129
Pagemaker 4.0	489
PFS First Publisher	89
Printshop	33
Publisher's Paintbrush	279
Publish It!	129
Ventura Publisher Gold / Windows	499

FINANCIAL

ACCPAC BPI Value Pak	359
ACCPAC Simply Accounting DOS	119
DAC Accounting 4.2	85
DAC Bonus Pack 4.2	119
DAC Accounting Upgrade	45
Managing Your Money	125
Microsoft Money for Windows	29
Money Matters	29
One Write Plus G/L, A/P & A/R	109
Pacioli 2000	69
Peachtree Basic Acctg	29
Peachtree Crystal Acctg. Windows	175
Peachtree Complete III	139
Peachtree with Data Query	209
Quicken DOS / Windows	41/41
The Manager's Organizer	139
Timeslips III	179
TurboTax DOS/Windows	45/59
Wealth Builder	89

DacEasy \$47

Accounting Upgrade
Upgrade or switch from your older DacEasy version to other accounting software (or even your spreadsheet if you use it for accounting) to the new DacEasy 3.2. Include General Ledger, A/P, Cash Management, A/R & Billing, Inventory, Purchase Order and Budgeting modules. DacEasy is truly easy to use, with content-sensitive and guided help, menu support and pull-down menus. It even includes a report generator & built-in graphics.



WINDOWS SOFTWARE

1-2-3 for Windows	399
1-2-3 for Windows Comp. Upgrade	89
3-D Charts to Go for Windows	55
ACCPAC Simply Acctg for Windows	119
Adobe Illustrator 4.0	359
Adobe Type Sets	Call
Adobe Type Align	59
Adobe Type Manager	58
Adobe Type Manager Plus Pack	115
After Dark for Windows	25
Ami Pro 2.0	279
Ami Pro 2.0 Competitive Upgrade	89



Microsoft Office \$447

This special bundle includes the leading Windows applications, Excel, Word and PowerPoint all in one! Excel is the top rated graphical spreadsheet, Word is the #1 selling Windows word processor and PowerPoint is the top presentation package. Act now and you will save half the cost if purchased separately.

Asymetrix Toolbook	279
BeckerTools	77
Bitstream Facelift	57
Corel Draw 2.0	349
Correct Grammar	57
Current	209
DBFast/Windows	319
Excel	299
Facelift	57
Form Publisher	139
Freehand	Call
Grammatik IV for Windows	55
HDC First Apps or Windows Express	55

MS Excel or Word Upgrade \$129 ea

Upgrade from the Spreadsheet or Word Processor you're using now to the word winning Excel for Windows. Excel 3.0 is the leading spreadsheet for Windows and includes ToolBook which simplifies many tasks to the click of a mouse. New Word for Windows 2.1 adds many new features to the top-selling Windows word processor. To upgrade you must first use the file pull pack from WordPerfect 1.2.3 for other qualifying software.

Hollywood	299
Instant Orgchart	119
JustWrite	75
Micrografx Designer	449



Windows Draw! \$95

Who says powerful Windows drawing programs have to be expensive? Not with Windows Draw! the fun to use product from Micrografx. Includes special effects, such as gradients and bit text to curves, object manipulation and outline tools. The 2600 customizable clipart images alone are worth the price!

MicroPhone II	89
Microsoft Ent. Pack I, II or III	27
Microsoft Mouse w. Windows 3.0	147
Microsoft Office (Word/Excel/Powerpoint)	447
Microsoft PowerPoint for Windows	309
Microsoft Productivity Pack	39
Microsoft Windows	89
Microsoft Windows Developer's Kit	309
Microsoft Word for Windows	299
M.Y.O.B.	129
Norton Backup	85
Norton Desktop	89
On Target	239
PackRat 4.0	239
Pagemaker 4.0	489



MS Works for Windows \$129

New Microsoft Works for Windows is the easy-to-use integrated software for Windows that's designed with small business users in mind. It includes a Word Processor with Speller and Thesaurus, Spreadsheet with charting, Database with report generator, and Drawing tools to design graphics you can paste into your word processing document. The line helps a click away and Works Wizards guides you through the process of creating custom documents.

Pers Jason	319
Per Form Pro	179
PFS WindowWorks	109
Pro Write Plus	159
Projct for Windows	429
Publisher's Powerpak	45
Publisher's Paintbrush	279
Quicken for Windows	41
Quattro Pro for Windows	Call
RightWriter for Windows	55
Turbo Pascal for Windows	119
Ventura Publisher	499
WideAngle for Windows	75
Win connect	59
Windows Draw	95
WinFax Pro	69
WordPerfect for Windows	249



We Ship Air at Ground Rates

GRAPHICS

Autosketch 3.0	139
Corel Draw 2.0	349
Design CADD 3-D	185
DrawPerfect	259
Freelance Graphics 4.0	299
Freelance Competitive Upgrade	89
Generic 3D Drafting	199
Generic Cadd Level 2 Starter Kit	85
Generic Cadd 6.0	279
Harvard Graphics	Call
PC Paintbrush IV Plus	109

Adobe \$359 Illustrator 4.0

Illustrator 4.0 for Windows brings unprecedented design & illustration power to the PC. It includes preview mode, cutting, 34-bit color support, and incredible text handling features. Ideal for the most advanced desktop publishers, Adobe Illustrator for Windows includes Adobe Separator and Adobe Type Manager with 40 fonts.



INTEGRATED

First Choice	95
Framework XE	95
Geoworks Pro	115
LotusWorks	89
SmartWare II	417
Symphony 2.2	489
Works	89
Works w/ MS Serial Mouse	149

PROGRAMMING

Borland C++	289
Borland ObjectVision for Windows	91
Macro Assembler	95
Microsoft C Compiler	299
Quick Basic	60
Quick C or Quick Pascal	60
Turbo Pascal Dos/Windows	90/119
Visual Basic for Windows	125
Windows Developer's Kit	309

SPREADSHEETS

Altways	115
Excel for Windows	299
Lotus 1-2-3 version 2.3	325
Lotus 1-2-3 version 3.1+	399
Lotus 1-2-3 2.3 or Comp. Upgrade	89

1-2-3 for Windows \$379

Lotus 1-2-3 for Windows is everything a Windows spreadsheet was meant to be. Which means it's simple, flexible, graphical and uniquely powerful. Includes SmartIcons, one-click shortcuts for your most frequently used shortcuts. 3D lectures and integrated graphics, data & fonts make your work get noticed! You can upgrade from your present spreadsheet through FastMicro for just \$89.



Quattro Pro 4.0	299
Quattro Pro 3.0 Comp. Upgrade	89
Quattro Pro 3.0 SE	45
Supercalc 5.1	89

WORD PROCESSORS

Facelift for WordPerfect	57
Grammatik V	55
LetterPerfect	119
Multimate 4.0	239
Professional Write	159
Publisher's PowerPak / WordPerfect	45

WordPerfect for Windows \$249

The #1 Word Processor comes to Windows! WordPerfect 5.1 for Windows is simple, powerful, and fun to use. WPWin includes customizable ButtonsBar, Extensive Data Exchange, and fully graphical integration. Upgrade from WP for DOS for \$77 or other word processor for just \$155!

Rightwriter DOS/Windows	55/55
Word	209
WordPerfect 5.1	249
WordPerfect for Windows	249
WordPerfect for Windows Upgrade	115
WordPerfect Add'l Station License	159
WordPerfect Office	89
WordStar Pro/Windows	187/259
Writer's Toolkit	79

UTILITIES

386 MAX	59
Address Book Plus	47
Calendar Creator Plus	47
Carbon Copy Plus	107
Central Point Backup	75
CheckIt	79
Company Ladder	45

MS-DOS 5.0 Upgrade \$55

Microsoft DOS 5.0 frees 45K or more for DOS on 286 & 386 PCs. It includes a new Shell, UnDelete and Unformat, new Editor and more. Also includes QuickCommand Line Help, new Backup and Windows enhancements. Plus you can install it on your drive without reformatting, even on Netware's. This official upgrade pack requires that you simply have an older command.com on your drive!

Control Room	69
CoreFast	60
Desqview 2.4	75
Desqview 386 2.4/6.0	125
Direct Access	57
Disk Manager Dos / Novell	36/119
Disk Optimizer	29
DR DOS 6.0	65
Fastback Plus	109
GoScript 4.0	89
Hijaak 2.0	95
InfoSpotter	45
Labels Unlimited	52
Laplack Pro	89
Microsoft Learning DOS	32
MS-DOS 5.0 Upgrade	55
Norton AntiVirus	79
Norton Backup	85
Norton Commander	30
Norton Utilities	109
PC Anywhere IV	109
PC Tools Deluxe 7.1	99

\$89

In addition to latest and greatest laptop to PC or PC to PC file transfers, new Laplink Pro ends the hassles of modern file transfers too! Its remote install feature allows you to transfer files to a PC without Laplink Pro. Includes parallel & serial transfer cables.



Personal Lawyer	34
P.D. Queue	55
Pop Drop Plus	53
PrintRite	19
ProComm Plus	67
Prodigy	25
QA Plus	85
QEMM 386 6.0	57
QRAM 2.0	49
SideKick 2.0	53
Sideways	55
Smartcom Exec	69
SpintRite II	69
Slacker	Call
Stacker XT8 / AT16	149/179
Super PC Kwik	43
Virex-PC	75
XTree Gold 2.0	89

FAST MICRO



For Pricing on Other Products or to Order, Call Toll-Free (800) 441-3278



TERMS: No Charge for Visa, MasterCard or Discover Card. All orders up to 20 pounds are shipped via Airborne Express. Minimum order \$50. Shipping & handling charge 3% (Min. \$6). Product warranties, offers & claims are handled by the manufacturer (all FastData branded products are warranted through FastMicro). Compatibility is not guaranteed, exception FastData products. No returns on used items (except FastData branded products). All opened returns subject to 15% restocking fee. FastData branded products: DOA - returned or replaced at our option. Call for return authorization (RA) before returning product. Shipping is not refundable. Sorry, no COD's. Personal/company checks delay shipping. AK, HI & APO addresses add \$15 per box. Prices are liability subject to change. Purchase orders accepted (no surcharges) from approved corporations only. AZ orders add 6.7% tax. **FastMicro** 1405 E. Baseline Road, Phoenix, AZ 85044 (602) 998-1111 FAX (602) 998-1111 (602) 441-3278 (602) 441-3278



IT'S EASY TO GET INTO AN INSIGHT COMPUTER



INSIGHT COMPUTERS

When you choose an Insight Computer, you're getting more than just a system that fits your computing needs. You're also gaining the support and knowledge of our friendly technical staff as well as the guaranteed performance of the Insight name. We've set high testing standards to make sure you receive a system with outstanding quality, always at competitive prices. Our team of experts is only a toll-free call away. It's easy, so call today and get into an Insight.

486-33 MHz Cache
\$1949

LEASE
\$76 mo.

30-DAY
GUARANTEE
NO MONEY BACK

4MB RAM • 64K RAM Cache
105MB 16ms IDE Hard Drive
Non-Interlaced 14" SVGA Color Monitor
16 Bit 1MB Super VGA Video Card
Both 1.2MB 5.25" & 1.44MB 3.5" Floppy Drives
2 Serial Ports, 1 Parallel Port
Enhanced 101 Key Keyboard
DOS 5.0 • Mouse

*Lease for as low as \$76 a month (36 mos.)**

"For a surprisingly low price, Insight managed to pull together a very powerful system for us." *PC Mag.* 3/17/92

"Insight delivers exceptional value at an exceptional price." *PC Computing* 8/91

800-998-8042

Insight

Get Into It.™





Climb into an Insight Computer and get the system that fits your needs. We've made it easier for you to determine which system is best for you.

At a glance, you can find the size, features and price you're looking for. Let our friendly experts show you how easy it is to get into an Insight.

386-25^{MHz}

\$1299

2MB RAM
105MB 16ms IDE Hard Drive
14" VGA Color Monitor Interlaced
512K 16 Bit VGA Video Card
12^{1/2}" 5.25" & 1.44^{1/2}" 3.5" F Drives
2 Serial Ports, 1 Parallel Port
Enhanced 101 Key Keyboard
DOS 5.0 • Mouse

*Lease as low as \$81 per month (24 mos.)**

486SX

\$2099

4MB RAM
200MB 16ms IDE Hard Drive
N.I. 14" Super VGA Color Monitor
1MB 16 Bit VGA Video Card
12^{1/2}" 5.25" & 1.44^{1/2}" 3.5" F Drives
2 Serial Ports, 1 Parallel Port
Enhanced 101 Key Keyboard
DOS 5.0 • Mouse

*Lease as low as \$81 per month (36 mos.)**

486-33^{MHz}

\$3299

8MB RAM • 64K Cache
520MB 12ms IDE Hard Drive
N.I. 14" Super VGA Color Monitor
1MB 16 Bit VGA Video Card
120/250MB Tape Backup
Fax Modem
12^{1/2}" 5.25" & 1.44^{1/2}" 3.5" F Drives
1 Parallel/2 Serial Ports • Mouse
Enhanced 101 Key Kbd. • DOS 5.0
486-50MHz processor add \$499

386SX-25^{MHz} NOTEBOOK

\$1649

8.5"x11"x1.8" • Under 6 pounds
2MB RAM (Expandable to 8MB)
60MB 23ms IDE Hard Drive
1.44MB 3.5" Floppy Drive
10" backlit 16 level LCD grey-scale VGA Display
80 Key Kbd. (101 key emulation)
NiCad battery pack • AC Adapt./recharger
2 Serial Ports, 1 Parallel Port
Ext. VGA port • Ext. Kbd. port • DOS 5.0

*Lease as low as \$102 per month (24 mos.)**

386-33^{MHz}

\$1599

4MB RAM • 64K Cache
105MB 16ms IDE Hard Drive
N.I. 14" Super VGA Color Monitor
1MB 16 Bit VGA Video Card
12^{1/2}" 5.25" & 1.44^{1/2}" 3.5" F Drives
2 Serial Ports, 1 Parallel Port
Enhanced 101 Key Keyboard
DOS 5.0 • Mouse

*Lease as low as \$70 per month (36 mos.)**

486-33^{MHz}

\$2699

4MB RAM • 64K Cache
200MB 16ms IDE Hard Drive
N.I. 14" Super VGA Color Monitor
1MB 16 Bit VGA Video Card
CD ROM Drive
Fax Modem
12^{1/2}" 5.25" & 1.44^{1/2}" 3.5" F Drives
1 Parallel/2 Serial Ports • Mouse
Enhanced 101 Key Kbd. • DOS 5.0

*Lease as low as \$104 per month (36 mos.)**

486-33^{EISA}^{MHz}

\$3999

8MB RAM • 64K Cache
520MB 12ms IDE Hard Drive
N.I. 14" Super VGA Color Monitor
1MB 16 Bit VGA Video Card
120/250MB Tape Backup
12^{1/2}" 5.25" & 1.44^{1/2}" 3.5" F Drives
2 Serial Ports, 1 Parallel Port
Enhanced 101 Key Keyboard
DOS 5.0 • Insight Mouse

486-50 MHz EISA processor add \$699

IT'S IN THERE!

- 30-Day Worry Free Guarantee
- 1 Year Parts & Labor Warranty
Express parts replacement for a full year.
- Toll-Free Tech Support
Experts are standing by 7 days a week.

HARD DRIVES International

Hard Drives International, our sister company, provides the highest quality, fastest, caching IDE hard drive for each system.

- Large selection of software available!



*Prices and availability subject to change without notice. P.O.'s accepted from qualified buyers. Net 20/30 Day Guarantee and 1 Year Warranty exclude software and may have some restrictions. 30-Day Guarantee not available on lease purchases. Corporate lease rates based upon 24 or 36 month fair market value lease plus applicable sales tax. Two months advance deposit required. Individual lease rates will vary. All trademarks and trade names herein are the properties of their respective owners. ©Insight Distribution Network, Inc. 1992 5/12/92



Get Into It.

Insight Computers

National Accounts: 800-755-3924

International Sales: 602-350-1144

1912 W. 4th St., Tempe, AZ 85281

602-350-1176 Fax: 602-350-1182

800-998-8042

Bulldog Systems

Bulldog's Standard Configuration

We guarantee all of our Bulldog systems and bundle each one with a Dual Floppy Drive • Super VGA Card with 1 Mb RAM (1024 * 768) • 14" Color VGA Monitor (1024*768) • MS DOS 5.0 • MS Windows 3.0 • Mouse • 1 year on-site warranty!

386-SX/25 w/ 80...	1525
386-25 w/ 100	1695
386-33 (64K CACHE) w/100.....	1795
486-25 (256K CACHE) w/200.....	2595
486-33 (256K CACHE) w/200	2695

Call For Other Configurations
Free shipping on all Bulldog Systems
prepaid with a cashiers check, money
order, or bank wire.



Figure 1: Standard Configuration

Bulldog Standard Configuration • 4 Mb
RAM • 256K system cache • 200 Mb
hard drive • 486 system cache running
33 MHz

\$2695

Network

3COM		
3C503 Etherlink II/Fivepack	195	799
3C503TP 10 Base T	229	
3C505B Etherlink Plus	579	
3C507 Etherlink 16	279	
3C523 MCA Ethernet	269	
ARTISOFT		
Starter Kit 2mbps/AE2 AE3	339	469 539
Lan Cards 2mbps/AE2 AE3	145/199	239

NOVELL		
Novell Lite 1.0		
Network 2.2 5.10 User	495	1099
Network 3.11 20/100 User	1950	3695
Ethernet NE1000/NE2000	135/155	

SMC		
PC130/PC130E	75	99
PC500WS/PC500FS	129/218	
HUB 8-Active 4 Passive	229	69
Ethercard 8 bit/16 bit	149/169	
Token Card 8 bit/16 bit	349/399	
10 Base-T Card 8 bit/16 bit	185	205

THOMAS CONRAD		
TC6242 TC6242 TP	85	99
TC6245 TC6245 TP	199/219	
TC6045 TC6045 TP	199/219	

Notebooks&Laptops

KLN SX16 NB w/ 40 mb	1379
Magnavox Metals SX16 w/40 mb HD	1595
Magnavox Metals SX20 w/60 mb HD	1895
Epson NB3 w/ 40 mb	2189 2425
Leading Edge DL1386 Plus	1450
Leading Edge NB 20 mhz/40 mb HD	1695
Panasonic CF370 Notebook	2650
Atari Portfolio Palmtop	238
HP Palmtop	525

Call for Pricing on Toshiba Laptops!

Software

Aldus		
Pagemaker	459	
Freehand	389	
Photo Styler	525	
Ami Pro 2.0 upgrade w/ Intermission	99	
Borland Turbo Pascal	89	
Carbon Copy	110	
Clarion ProDeveloper	449	
Clipper 5.0	499	
Core Draw	365	
Dbase IV	479	
Deskview 386	129	
Enable O/A 4.0	459	
Foxbase/FoxPro	195-449	
FoxPro Distribution Kit	299	
Freelance Plus	309	
Harvard Graphics	389	
Lotus 2 3/3 1 Plus	345/399	
Lotus Symphony	479	
Lotus for Windows	415	
Microsoft Windows 3.0/Word	115/219	
Microsoft Word for Windows	319	
Microsoft Excel for Windows	319	
Norton Desktop for Windows	Call!	
Norton Utilities 6.0/Norton AntiVirus	115/85	
PC Anywhere	139	
PC Tool	119	
Peachtree III Complete/Double Bonus	139/219	
Paradox V3.5	489	
Q&A 4.0	229	
Quattro Pro	299	
Ventura Desktop Publishing	479	
Word Perfect 5.1/Windows	238	
Word Perfect for Windows	269	
Wordstar 6.0/2000	169/259	

Monitors

NEC		
MULTISYNC		
4FG	655	
4FG	799	
PANASONIC		
1381 1395	329	439
SAMSUNG		
CVL 4851	399	
Flat White ML4571	119	
MAGNAVOX		
9CM082	335	CTX
5468 5468NI	309	349
3436 Multiscan 28	399	
NANAO		
9070Q 9080	1019/1269	

Drives

CONNER		
40 IDE 3.5" 104 IDE 3.5	199	339
200 IDE 3.5"	549	
OWSGA		
90 MB Insider/Transportable	799/825	
Dual 80 ext	1595	
MAGNAVOX		
461RS EXT CD ROM w/Software	419	
MAXTOR		
40 MB AT IDE/80 MB IDE	229/299	
213 A 210 mag	589	
PLUS DEVELOPMENT		
Hard Card XL 50 105 for AT	309	449
SEAGATE		
ST225 ST238 Kit XT	219/229	
ST251 1 42 mb MFM	239	
ST 3096A 89 mb IDE	289	
ST 1239A 210 mb IDE	579	
ST 3144A 120 mb IDE	379	
FLOPPY DRIVES		
380K/1 2MB/1 44MB	59/59 59	

Modems & Fax

ADTECH MICRO SYSTEMS		
Datafax 2400 Modem 9600 Fax	99	
Externally Yours Modem Fax	139	
Smart Connect 2400INT w/MNP5	85	
CARDINAL		
2400 INT EXT	65/89	
2400 INT EXT w/MNP	119/145	
9600 INT EXT	299/325	
EVEREX		
2400 Int Ext w MNP	149 185	
24 95 Fax Modem Int/Ext	245 309	
HAYES		
2400 Int/Ext	269/329	
9600 V Series Int/Ext	525 659	
Optima 9600 V 42		
PRACTICAL PERIPHERALS		
2400 Int/Ext	129	
9600 SA Ext	475	
2400 Pocket Modem		
US ROBOTICS		
9600 Courier HST Ext	509	
CALPAK 2400 int w MNP software	58	

Math Co-Pro

INTEL		
387 33	199	
387 SX16 20	125/135	
CYRIX		
387 16/20 /25	159	
387 33	167 33	
387 SX16 20	105/115	
287 XL	85	
387 40	205	
MEMORY		
1MB SIMM 80ns	45	
4 MB SIMM 80ns	159	

Think of Us as Your Personal Consultant

In today's economy more and more folks are looking to Bulldog to stretch their dollars. We'll help you sort through the gems and the clunkers in a constantly changing industry. We'll guide you through the maze of selection and purchasing with all of your questions answered cheerfully by our well trained, knowledgeable staff.

If you don't see it here, call us! We can help!

Toll Free **1-800-438-6039**

Video Cards

ATI		
VGA Integra 512K	99	
Graphics Vantage 1mb	349	
Graphics Ultra w/ 512K/1MB	415/529	
8514 Ultra Plus w/ 512K/1MB	459/529	
BOCA		
Basic VGA/Super VGA w/512K	69/129	
CARDINAL		
VGA 700/732 w/1MB	139/189	
HERCULES		
Graphics Station w/1MB	669	
ORCHID		
Prodesigner IIS w/ 1 mb	225	
Fahrenheit 1280 Degree with 1 MB	349	
VIDEO SEVEN		
10241 256K 512K	119 149	
VRAM II 512K/1MB	229/299	

Printers

EPSON		
DFX 5000 8000	1269/2139	
LX810	155	
FX850 FX1050	229/259	
LQ200 LQ570	435 569	
LQ2550	649	
LQ1070	359	
Action Laser	699	
IBM		
PPS II 2390/2391 320CPS	359 499	
PPS II 2390 2381 (24 wire 200 CPS)	359 499	
4226 533 CPS	1550	
NEC		
Graphics Engine w/1MB	889	
ORCHID		
Prodesigner IIS w/ 1 mb	225	
Fahrenheit 1280 Degree with 1 MB	349	
VIDEO SEVEN		
10241 256K 512K	119 149	
VRAM II 512K/1MB	229/299	

Mice & Misc.

Microsoft Mouse w/Windows 3.0	139
Microsoft Mouse w/PC Paintbrush	109
Microsoft Ball Point Mouse	118
Logitech Mouseman Serial/Bus	69
Logitech Trackman Serial/Bus	69
Logitech Cordless Radio Mouse	429 469
Tripple BC-750/750 LAN	1275
Epson 300C w/ interface	1275
Logitech Scan Man/Scanman 256	149 269

Memory Boards

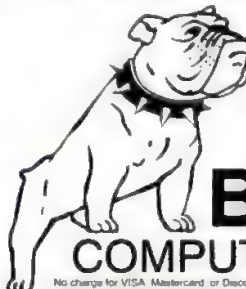
AST		
Six Pack w/384K XT	129	
Six Pack 286 w/OK AT	85	
Rampage PC w/ 1 mb	285	
INTEL		
Above Board w/512K XT/AT	285	
Above Board II w/OK PS 2	219	
Above Board-B w/2MB AT	397	
Intel Snap in 386	359	
ORCHID		
Ramquest 16/32 w/OK PS/2	189	
Ramquest 8/16 w/OK XT/AT	129	
EMULATION BOARDS		
AST 5251-11 Enhanced Plus	509	
DCA Irma Board III	405	
DCA E78+ Software	830	
ACCELERATOR BOARDS		
Orchid Tiny Turbo 286 Extra	119/179	
Intel Inboard 386PC w/1 mb	499	

Tape Drives

ARCHIVE		
40 Meg Int/Ext	239/349	
60 Meg w/Cont Int/Ext	579	
COLORADO MEMORY SYSTEMS		
DJ10 120 Meg Int Jumbo	199	
DJ20 250 Meg Int Jumbo	269	
QFA 700 NEW 700 Meg Int	739	
EVEREX		
60F Int	219	
60 MB Wanglec w/Card Int/Ext	599/739	

610 Industrial Park Drive
Evans, Georgia 30809

OPEN weekdays: 8:30 a.m. to 7:30 p.m.
Saturday 11:00 a.m. to 3:00 p.m.
(404) 860-7364 • FAX (404) 860-7358



BULLDOG COMPUTER PRODUCTS

No charge for VISA, Mastercard or Discover. Shipping and handling 3 1/2% (minimum \$11) APO & FPO addresses add 50% off. Product warranties, offers and claims are handled by the manufacturer. DOA's repaired or replaced at our option during the first 30 days only. No returns on used items. All return shipments are subject to a 15% minimum restocking fee. Defective software replaced with same item only. Call 404 860 7354 for a Return Authorization number prior to returning any product. Shipping charges are non-refundable. Bulldog cannot guarantee compatibility. All prices are U.S. and are subject to change and availability. Georgia residents add sales tax.

CIRCLE 015 ON READER SERVICE CARD

1-800-438-6039

1 OF THE NATION'S LARGEST OKIDATA DEALERS

WHY PAY RETAIL?
CDW® Sells For Less
 AND SERVICES YOU BETTER

TAKE IT FROM THE EXPERTS: ONLY CDW® CAN SAY THIS

- ✓ **EXCEPTIONAL QUALITY**
- ✓ **EXCELLENT VALUE**
- ✓ **TREMENDOUS SELECTION**
- ✓ **QUALITY SERVICE***
- ✓ **BUY WITH CONFIDENCE**

*Same Day Shipment On Most Orders

CDW® & OKIDATA® MAKE WONDERS WORK FOR YOU



ONLY \$1298.50

OL830

- 8 PPM With Adobe PostScript With ATM 2.0 Standard And HP LaserJet Series II • 2 MB Of Ram
- Parallel Interface • 17 Adobe PostScript Fonts
- Second Paper Tray And/Or Serial AppleTalk Interfaces



The Personal Page Printer For Smaller Budgets

OL400 LED Page Printer

- 4 Pages Per Minute • 300 DPI Resolution
- 512 KB Standard RAM
- 2.5 MB Maximum RAM
- 17 Fonts • Output Tray
- 200 Sheet Input Tray
- Manual Feed Input
- Centronics Parallel Interface
- RS-232 Serial Interface (Opt.)

OUR HOT SELLER!!!

Feature	OL400	HP IIP	CDW® Price
Price	\$895	\$1495	\$589.40 CDW Part #12884
Paper Input	200	50	
Fonts/Typefaces	17/4	14/2	
Printhead Warranty	5 yr.	1 yr.	



The Value Packed Printer For Growing Businesses

OKIDATA

OL800 LED Page Printer

- 8 PPM • 300 DPI Res. • 512 KB Stnd. RAM
- 4.5 MB Max. RAM • 200 Sheet Input Tray
- Manual Feed Input • 26 Fonts • Centronics Parallel Interface • RS-232 Serial Interface (Opt.)



OL840 LED Page Printer

- 8 PPM • 300 DPI Res. • 2 MB RAM • 4 MB Max RAM
- 26 Fonts • 200 Sheet Input Tray, Manual Feed Input • Centronics Parallel Interface
- AppleTalk (8-Pin DIN) Interface

Feature	OL840	HP III W/PS	CDW® Price
Price	\$2395	\$3425	\$1594.50
Font Scaling	Hardw.	Firmw.	
Fonts	13	8	
Second Paper Tray	\$289 + \$89	None	
AppleTalk	Included	\$275	CDW Part #16172

Feature	OL800	HP III	CDW Price
Price	\$1499	\$2395	\$926.96
Paper Input			
Fonts/Typefaces			
Printhead Warranty	5 yr.	1 yr.	
			CDW Part #14071

Microline 320 & 321

- ✓ 9-Pin ✓ 300 CPS Draft ✓ 63 CPS NLQ ✓ Epson Emulation
- ✓ IBM Compatible

Model 320 **\$314.68** CDW 15676
 Model 321 **\$438.44** CDW 10515

Microline 390 & 391 Plus

- ✓ 24-Pin Printhead ✓ 270 CPS Draft ✓ 90 CPS NLQ ✓ IBM & Epson Compatible

Model 390 Plus **\$439.22** CDW 10971
 Model 391 Plus **\$596.41** CDW 12556

Microline 393 Plus

- ✓ 24-Pin ✓ 520 CPS Draft ✓ 120 CPS NLQ ✓ 16-inch Paper Width
- ✓ Top/Bottom Paper Feed ✓ Parallel & Serial ✓ IBM Compatible

CDW® Price **\$919.20** CDW 15706
 Color Model **\$999.50** CDW 11408

Microline 380

- ✓ 24-Pin Printhead ✓ 180 CPS Draft ✓ 60 CPS NLQ ✓ 8 LQ Fonts ✓ 8K Buffer ✓ Bottom/Tractor Feed

CDW® Price **\$209.00** CDW 15526

MOST ORDERS RECEIVED AT 5:00 P.M. C.D.W. SHIP SAME DAY

IF YOU FIND A BETTER PRICE CALL US BEFORE YOU BUY
 240 MARK HONTHOUSE & WALL TRL 199-291-1737

PC Magazine says... "You may find a better deal here than anywhere else."

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE™ NOW!

PCM435

WE SELL NAME BRAND ITEMS FOR LESS!

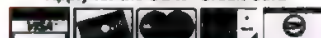
(800) 326-4CDW

In Illinois FAX
 (708) 498-1426 (708) 291-1737



COMPUTER DISCOUNT WAREHOUSE™
 SERVING YOUR PC NEED SINCE 1982. DON'T ACCEPT ANY INTERLUDES.

Apply for the CDW® Credit Card



High Volume Bids Invited

CDW® EXTENDED HOURS
 For more information call 1-800-326-4CDW
 or visit our website at www.cdw.com

ATI Graphics Ultra[®] w/1 MB

• When It Comes To Speed And Resolution, ATI Technologies' Graphics Ultra Offers Superior Performance
• Install An ATI Graphics Accelerator And Transform Your Computer Into A Graphics Workstation!
• Watch Your 8086 Outperform Faster 80486 Computers With The Addition Of An ATI Graphics Accelerator!
• True 1280 x 1024 Windows Support; 76 Hz Refresh At 1024 x 768
• Crystal Fonts Provide The Equivalent Of 3200 x 2400 Resolution On 1024 x 768 Monitors • Also Includes Microsoft Compatible Input Mouse • Don't Wait, Experience Superior Graphics Performance Today!!!



WHY SETTLE FOR LESS?

CDW[®] SERVICING YOUR COMPUTER NEEDS SINCE 1982



INTEL RapidCAD[™] Engineering CoProcessor

• The Intel RapidCAD[™] Engineering CoProcessor boosts the performance of technical applications like CAD, engineering, mathematics, science and statistics. Engineered specifically for Intel386[™] DX microprocessor-based systems, RapidCAD processes data up to 70% faster than a standard math coprocessor. Install it into Intel 386 DX systems without a math coprocessor, and your gains are even more dramatic. And because speed means productivity, RapidCAD is cost effective, paying for itself in just a few weeks.

CDW[®] Price **\$435.41** 19918

CDW[®] Price **\$359.45** 21981

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

NETWORKING PRODUCTS

INNOVELL

NOVELL Netware V2.2 5-User 5.25"	\$483.70
NOVELL Netware V2.2 10-User 5.25"	1106.43
NOVELL Netware V2.2 50-User 5.25"	1949.58
NOVELL Netware V2.2 100-User 5.25"	3056.57
NOVELL Netware V3.11 5-User 5.25"	669.50
NOVELL Netware V3.11 10-User 5.25"	1397.46
NOVELL Netware V3.11 20-User 5.25"	1889.17
NOVELL Netware V3.11 50-User 5.25"	2999.11
NOVELL Netware V3.11 100-User 5.25"	3667.35
NOVELL Lite Starter Kits	69.00
NOVELL Lite Add On Kit	399.77
ETHERNET Interface Connector (NE1000)	209.65
ETHERNET Board (NE2000)	129.44
ETHERNET EISA (NE3200)	157.08
ETHERNET EISA (NE3200)	687.50

3Com

3COM 3C503 10 Base T	\$229.88
3COM 3C507 Ethernet Card	281.61
3COM 3C503 Ethernet	188.24
3COM Ethernet Repeater	548.31

THOMAS-CONRAD

6242 Arcnet 8-Bit	\$85.89
6245 Arcnet 16-Bit	179.31
6245 Twisted Pair Plus Ethernet	229.07
6246 PS/2 Board Arcnet	228.16
6151-11 16 Port Smart Hub	691.01
4045 16/4 Token Ring XT/AT	499.23

SMC[®] ACCESSORIES

SMC 3512 1P 12-Node Concentrator	\$709.18
Active Hub 8 Port Coax	249.86
Active Hub 8 Port Twisted Pair	355.68

SMC INTERFACE CARDS

3008 Coax 8-Bit Ethernet	\$143.50
3008 TP 10 Base T 8-Bit Ethernet	146.99
3016 TP 10 Base T 16-Bit Ethernet	189.20
PC 600FS Coax Arcnet File Server 16-Bit	209.25
PC 600WS Coax Arcnet Workstation 16-Bit	129.88
PC 600FS TP Arcnet File Server 16-Bit	209.25
PC 600WS TP Arcnet Workstation 16-Bit	129.88
SMC PC130E 8-Bit Arcnet Coax	75.25
SMC PC130E 8-Bit Arcnet Coax	99.00
SMC PC270 TP Arcnet	109.33
Eisa 3200 Arcnet Twisted Pair	736.08
SMC 8-Bit 10 Base T Ethernet Elite	144.40
SMC Ethernet Plus/A PS/2 Coax Elite	224.10
SMC 16-Bit Ethernet Plus Coax Elite	159.80
SMC 8-Bit Ethernet Plus Coax Elite	124.55
SMC Combo Ethernet TP, Coax, AUI Elite	197.57

XIRCOM

Arcnet Pocket Adaptor Coax	\$237.50
Arcnet Pocket Adaptor RJ45	239.77
Ethernet Pocket Adaptor Thin Coax	329.55
Ethernet Pocket Adaptor 10 Base T	329.55
Parallel Port Multi	69.00

ARTISOFT

ARS-190 AE1/T 10 Base T Adaptor, 8-Bit	\$139.92
ARS-170 AE2/T Ethernet ISA Adaptor, 16-Bit	199.58
ARTISOFT NOS AI Software	54.50
E143 Ethernet Adaptor Kit	199.58
LANtastic Ethernet Starter Kit 4.0	448.31
LANtastic 2Mbps Starter Kit	325.50
LANtastic 10 Base T Starter Kit	589.20
LANtastic 2Mbps Adaptor	129.64

CALL FOR ADDITIONAL ARTISOFT PRODUCTS

NETWORKING SOFTWARE

IBM TOKEN RING

IBM 16/4 PS/2 MCA	\$638.80
IBM 16/4 XT/AT	634.50
IBM 16/4 Multi Access Unit MAU	468.53

INTEL NETWORKING

INTEL Token Express EISA 16/4	\$648.88
INTEL Ether Express 16-Bit Coax	119.32
INTEL Ether Express 16-Bit TP	134.33
INTEL Token Express XT/AT 16/4	509.23
INTEL Ether Express EISA	609.50

BORLAND dBase IV LAN Pak	\$626.37
BORLAND Quattro Pro Network Node	244.30
BRIGHTWORKS PS Print	243.88
CC Mail Products	CALL
FIFTH GENERATION Direct Access Network	344.57
HARVARD GRAPHICS LAN Pack	CALL
LOTUS 1-2-3 2.3 Server	558.66
LOTUS 1-2-3 2.3 Network Node	339.47
LOTUS 1-2-3 3.1 Server	629.54
LOTUS 1-2-3 3.1 Network Node	426.16
MICROCRIM Rbase V3.1 LAN 6 Users	509.00
MICROSOFT Word 5.5 Network Node	185.39
MICROSOFT Excel Network Nodes	249.11
NORTON LAMBERT PRODUCTS	CALL
ONTRACK Desk Manager For Novell	117.48



Lotus

WORD PERFECT 5.1 5 Pack	1099.37
WORD PERFECT Office 5.0 User V3.01	278.79
WORD PERFECT Office 20PK V3.01	623.08
WORD PERFECT Draw Perfect Server	269.53
WORD PERFECT Draw Perfect Add Station	185.83

TAPE & FLOPPY DRIVES

COLORADO

COLORADO Jumbo 120	\$189.37
COLORADO Jumbo 250	253.58
COLORADO QF4700	724.92

Call For Accessories And Interfaces

Mountain

MOUNTAIN 120MB Internal Tape Drive	\$239.80
MOUNTAIN 120MB External Tape Drive	449.90
MOUNTAIN 250MB Internal Backup	474.42
MOUNTAIN 304MB Internal IDE Backup	539.90
MOUNTAIN 250MB External Filesave	1479.13
MOUNTAIN 525MB Filesave External	2389.42
MOUNTAIN 2.0 Gigabyte External Filesave	3619.20

Call For PS/2 Drives, Controllers, Accessory Kits and Tapes

IRWIN

IRWIN A120PC-120 MB Internal	\$225.19
IRWIN A250 PC	280.89
IRWIN A250PC-250 MB Internal	280.89
IRWIN A120E-120 MB High Speed External	262.13
IRWIN A250E-250 MB High Speed External	346.68
IRWIN 9131se, 4 Gigabyte, External	2031.03
IRWIN 9231se, External	3680.46

Call For Controllers, Accessory Kits and Tapes

SUMMIT

SUMMIT 120MB Internal	\$199.20
SUMMIT 250MB Internal	263.30
SUMMIT 304MB Internal IDE 120MB min	499.22

PLOTTERS, DIGITIZERS & SCANNERS

CalComp

CALCOMP 12 x 12 w/16 Bit	CALL
CALCOMP 12 x 18 w/16 Bit	CALL
CALCOMP 2024 Pacesetter D	CALL
CALCOMP 2036 Pacesetter E	CALL

HURTA

KURTA 12 x 12 XLP	\$234.50
KURTA 12 x 18 XLP	489.29
KURTA 12 x 17	538.27

Summagraphics

Summagraphics Summa II 12 x 12	\$279.80
Summagraphics Summa II 12 x 18	542.96
COMPLETE PC Full Page Scanner	526.66
EPSON ES300C Color Scanner	838.11

HOUSTON INSTRUMENT

HOUSTON INSTRUMENTS DMP-161	\$2795.42
HOUSTON INSTRUMENTS DMP-162	3495.40

HEWLETT PACKARD

HP7575 DXL	\$3079.88
HP7475A	1236.26
HP7550B	2999.70
HP7570A	2529.36
HP7575 DXL	3867.25
HP SCANJET	564.45
HP SCANJET II C Color XT/AT	1449.10

CAD MONITORS & CARDS

HERCULES Graphics Station Gold 16	\$378.13
MITSUBISHI HG-645 AKTL 19"	1736.91
MITSUBISHI WL-691 SATK	1959.77
SIGMA Laserwin 19"	866.82
ATI Graphics Ultra 1MB	435.41
ATI 8514 Ultra, 1 MB	379.77

FAX & ACCESSORIES

A-B Switching Box (AB X Box)	\$89.00 / \$34.95
ATI Stereo FX Sound Card	129.78
BROWN-WAGH Sound Blaster	112.80
BROWN-WAGH Sound Blaster Professional	189.28
CH PRODUCTS PS/2 Gamecard III	47.25
CH PRODUCTS XT/AT Gamecard III w/ Cable	36.50
CH PRODUCTS Flight Stick	47.00
CH PRODUCTS March III Joystick	31.20
COMPLETE PC Communicator	299.58
COMPLETE PC Portable Fax	299.58
Electronic 4-Way Switching Parallel	89.50
Electronic 4 to 2 Parallel Box	109.50
INTELLICOM Long Link	117.70
KEYTRONICS 101	79.01
KEYTRONICS 5151 IBM or AT&T	126.76
PACIFIC Data Connect 1.25MB	332.58
PRACTICAL Par/Ser Universal Buffer	149.50
XT Power Supply 150 Watt	59.00
AT Power Supply 200 Watt	79.24
Complete Fax 9800	399.50
JETFax I	669.32

CD-ROM & OPTICAL DRIVES

HITACHI 8000/60	\$456.81 / \$495.68
HITACHI 1700S External	467.42
MAGNAVOX 461RS Ext. w/CD Bundle	398.70
NEC CD-ROM 361 External Portable	388.40
NEC CD-ROM 73M External	507.22
NEC CD-ROM 130M Internal	539.16
PANASONIC LF5014 Worm Internal	2069.91
PANASONIC LF7010 Ext. 1 Gb Erasable Optical	1805.48
SONY CDU-720S External CD-ROM	2579.20
SONY CDU-53S Internal CD-ROM	494.78
SONY CDU-54101 Internal SCSI CD-ROM	354.17
SONY SMO-5501 850MB Erasable Optical	418.32
TOSHIBA 4001 External	2880.42
TOSHIBA 3301 Internal	646.06
CD-ROM Software 5 CD's Bundle, Call For Titles	539.32

SOFTWARE

ACT Software 2.1	\$209.80
ALPHA FOUR 1.1 Relational Database	299.50
AUTODESK AutoSketch	142.00
AUTODESK Animator	277.48
BANNER BLUE Orig. Plus Advanced	62.30
BORLAND dBase IV	469.10
BORLAND Reflex	157.95
BORLAND Sidekick V.2.0	54.87
BORLAND Turbo C++	84.75
BORLAND Turbo Pascal	83.00
BORLAND C++ V3.0	296.17
BORLAND Paradox V.3.5	469.98
BORLAND Quattro Comp Upgrade	98.78
BORLAND Quattro Pro 3.0	298.22
CENTRAL POINT PC Tools V.7.1	98.43
CLARION Professional Developer	433.33
DAC Easy Accounting 4.2	86.33
DAC Easy Bonus 4.2	129.31
DATABASE File Management	824.88
FIFTH GENERATION Mace Util. 1990	89.80
FIFTH GENERATION Fastback 3.0	116.08
FIFTH GENERATION Direct Access	63.77
FORM TOOL 3.0	57.90
FOXBASE Foxpro 2.0	439.99
GEOWORKS Ensemble	119.42
HELIUM Netroom	49.90
IBM Displaywrite 5.0	235.50
INTUIT Quickwrite 5.0	285.25
LAN Spool 286/386	257.10 / 362.21
LOTUS 1.2.3 V2.3	319.85
LOTUS 1.2.3 V3.1 Plus	385.50
LOTUS Agenda V2.0	259.91
LOTUS Double Up Upgrade	148.37
LOTUS for Windows	389.90
LOTUS Freelance Graphics	339.78
LOTUS Magellan	94.10
LOTUS Manuscript	309.79
LOTUS Symphony	455.59
LOTUS Upgrade	CALL
MICROCRIM Rbase V.3.1 For DOS	449.80
MICROCOM Carbon Copy V6.0	106.37
MICROSOFT C Compiler 6.0	298.60
MICROSOFT DOS 5.0 Upgrade	49.90
MICROSOFT Flight Simulator 4.0	39.50
MICROSOFT Fortran Compiler 5.0	274.44
MICROSOFT Quick Basic Compiler 4.5	64.75
MICROSOFT Upgrades	CALL
MICROSOFT Visual Basic	119.20
MICROSOFT Word V5.5	199.90
NANTUCKET Clipper V5.0	469.88
POWER UPI Calendar Creator Plus	49.80
PROCOM Plus	83.67
QUARTERDECK Desquiview 386 V.2.4	129.86
QUARTERDECK QEMM 386 Manager	59.90
QUARTERDECK QRAM & Manifest	49.30
QUARTERDECK QRAM & Manifest for PS/2	59.00
QUARTERDECK Desquiview	72.10
QUALITAS 386 Max 5.0	84.19
SOFTLOGIC Software Carousel	53.40
SOFTWARE PUB PFS Write	154.30
SOFTWARE PUB Harvard Graphics V3.0	387.88
STACKER SOFTWARE	79.95
STACKER Software And Board For AT 16 Bit	169.99
SYMANTEC Norton Advanced Utilities V6.0	109.90
TRAVELING SOFTWARE Laplink Pro	85.58
WORDPERFECT 5.1 5.25" or 3.5"	247.46
WORDPERFECT LetterPerfect	119.99
XEROX Ventura Software Version 3.0	493.44
ZSOFT PC Paintbrush IV Plus	109.96

CD ROM SOFTWARE

RTM National Geographic Mammals CD	\$129.17
RTM Great Cities of the World I & II CD	79.07
MICROSOFT Beethoven's 9th For Windows CD	65.50
MICROSOFT Works For Windows CD	139.20
COMPTON Family Encyclopedia CD	329.33
BRODERBUND Carmen San Diego Deluxe CD	53.10

AT CDW[®] YOU GET MORE COMPUTING FOR YOUR BUCK. CALL NOW!

♦ CDW[®] means Service ♦ CDW[®] means Savings ♦ CDW[®] means Business ♦ CDW[®] means Experience
♦ CDW[®] means Technology ♦ CDW[®] means Networking ♦ CDW[®] means Computing

FREE TECHNICAL SUPPORT FOR CDW[®] CUSTOMERS.

(800) 326-4CDW
WE SELL NAME BRANDS FOR LESS!

ALWAYS WORKING TO KEEP YOU COMPUTING ONE STEP AHEAD.



EPSON Action Laser II

- 6 Pages Per Minute
- Speed • 512 K Standard
- Fully-Featured, Easy-To-Upgrade
- HP IIP, Epson FX NLQ Emulation • Expandable
- to 5.5 MB w/Optional Expansion Board • HP Compatible
- Font Slot • Serial and Parallel Auto Sensing Ports
- Option: Multi Media Tray

CDW Price **\$648.50** 20092

WHY PAY RETAIL?

CDW Sells For Less

AND SERVICES YOU BETTER

MAGNAVOX METALIS/SX16 Notebook PC

- 80C386SX Microprocessor, 16/8 MHz • 1 MB RAM, Exp. to 2, or 5 MB On Main Board • 3.5" 1.44 MB • 40 MB With Access Time of 29ms • LCD Screen: 8 & W With 32-Gray Scale • Keyboard Selectable Normal/Reverse Video Mode • 640 x 480 Resolution • 80 Key Keyboard • Password Protection, Extended/Expanded Memory, Shadow RAM, Power Management Options • System Also Includes: 2400 Baud Internal Fax/Modem, User's Manual, MS DOS, Custom Slip-Cover Carry Case • One Year Parts/Labor Warranty



FREE CASE WHILE QUANTITIES LAST

CDW Price **\$1299.00** 22227

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

COMPUTERS

MAGNAVOX

MAGNAVOX SX16 40MB, 1 MB, 2 Drives	\$729.25
MAGNAVOX SX20 80MB, 2 MB, Windows, Mouse	\$889.50
MAGNAVOX SX16 40MB CD-ROM	1048.80
MAGNAVOX SX20 80MB, Int. CD-ROM	1329.25
MAGNAVOX 386SX 120MB HD, 2 MB, VGA	1299.00
MAGNAVOX Metalis/SX16 VGA 40MB NB Model	1409.20
MAGNAVOX Metalis/SX20 VGA 60MB Notebook	1679.15

PACARD DELL

Force SX16N 85 MB HD 2MB VGA Mouse	\$849.10
Force SX16N, 107 MB HD, 2MB, Modem, Mouse	1049.15
Force 486SX, 105 MB HD, Modem, Mouse	1699.33
Force 486/33, 130 MB, 4 MB, Modem	1979.15
Force 486/33, 210 MB HD, 4MB, Modem, Mouse	2232.29

ALR

ALR PowerFlex 386SX Model I	\$829.11
ALR 386/33 Model I	1599.25
ALR Business Venia 486 33 101	1899.10

CALL FOR THE LATEST MODELS FROM ALR

COMPAG

LTE/Lite 20MHz 4MB \$2495.20 Port 486C M120	\$964.10
LTE/Lite 20MHz 4MB \$1799.40 Port 486C M120	\$727.47
DP36520 Mdl 1 1709.20	OPC486/33M M3 1399.78

NEC

ULTRALITE SX20 80MB Notebook	\$2372.44
ULTRALITE SL20 80MB Notebook	2999.25
ULTRALITE III Notebook	NEW LOW PRICE
NEC 386/33, 4MB Super VGA, 2 Drives	CALL
NEC 386SX/20, 2MB VGA, 2 Drives	CALL
NEC 486/33, 4MB Super VGA, 1 Drive	CALL

TEXAS INSTRUMENTS

TI TravelMate 2000 20MB/40MB	\$926.32 / \$1229.88
TI 3000 SX Notebook 40/60MB	1869.85 / 2295.50
TI 3000 SX Notebook 80/120MB	2848.30 / 2995.50
TI 3000 WIN SX 60MB/80MB	2699.00 / 2967.00
TI 3000 WIN SX 120MB	3299.00

HP, IBM & COMPAG MEMORY

2MB Memory Board CPO LITE 285	159.83
4MB Memory Board CPO LITE 285	431.25
4MB Memory Card CPO LITE 386S	61.99
2MB Memory Board CPO SLT 386	195.00
4MB Memory Board CPO SLT 386	399.00
4MB Module CPO - 386, 20E/25E	253.24
4MB CPO Exp. Bd. - 20E/25E	299.95
1 MB AST Cud Simms	66.93
4 MB AST Cud Simms	245.25
AST Exec 386SX 4 MB Module	249.75
2MB Upgrade HP LaserJet II/IIi	165.32
1MB Upgrade HP LaserJet IIP / III	89.40
2MB Upgrade HP LaserJet IIP / III	165.32
4MB Upgrade HP LaserJet IIi / II	279.00
IBM Personal System II Memory	CALL
2MB Memory Module IBM PS/2 Mod 70/50Z	142.85
1MB OKI Laser 400	102.59

KINGSTON FOR TOSHIBA

2MB 1200XE	\$149.35
2MB 3100SX	149.35
4MB 3200SX	278.52
2MB Memory Module TOSHIBA 5200	599.00

WYSE TERMINALS

WYSE 50 Amber or Green	\$346.15
WYSE 60 Amber or Green	279.92
WYSE 16000 Amber or Green	321.98/274.99
WYSE 185 VT320 Amber, Green or White	345.60
WYSE 150 Amber, Green or White	260.45
WYSE 125 Color	545.40
WYSE 125 Color	545.40

MATH COPROCESSORS

INTEL 387DX 16/20/25/33	\$195.25
INTEL 387SX16/SX20	118.00/128.50
INTEL 287XL/287XLI	78.00/78.00
INTEL 487SX	454.44
INTEL Rapid Card For All 386 DX's	350.45
CYRIX FastMath SX16/SX20	104.42/117.47
CYRIX FastMath DX16/20/25	135.25
CYRIX FastMath 287 8/20 MHz	78.00
CYRIX FastMath DX33 MHz	159.90
CYRIX FastMath DX40 MHz	199.40

DOT MATRIX & LASER PRINTERS

EPSON

LX810	\$154.00	FX850	\$299.00
LO870	435.00	EPL 7500 Laser	PS1899.00
LQ2550	848.00	LQ1170	584.00
FX11050	395.00	LO570	254.00
Adorn Laser I 60PM/6450	LO1070	368.00	
DFX 5000	1268.00	DFX 6000	2129.00
EPL 8000 Laser	10 Pages Per Minute		1339.50

NEC

Stentwriter II 90	\$1394.62	PC3000	\$806.06
PC3000 24-pin	399.92	PC3000 24-pin	222.11
PC3000 24-pin	322.55	PC3000	969.21

DICOMIX by KODAK

701 Parallel	\$429.20
180 SI Parallel/180 SI Serial	296.28 / 307.74

OKIDATA

ML184 Turbo	\$267.89	ML390+	\$439.22
OL400	589.40	ML391+	596.41
OL800	825.95	ML380	236.00
OL830	1314.50	ML383+	919.20
OL840	1894.50	ML393+ Color	999.50
ML320	306.29	ML321	438.44

Panasonic

1124 L	\$275.95	1624	\$339.93
1123	169.47	1180	149.99
2180 Laser	CALL	2123	169.47
1654	539.86		
4450 Laser	1019.12		
4410 Laser Printer/455 Laser Postscript	CALL / 1749.78		

TEXAS INSTRUMENTS

TI Microlaser PS17	\$1179.00
TI Microlaser PS35	1469.00

HEWLETT PACKARD

H-P LaserJet Model IID	\$2329.22
H-P Deskjet 500iP LaserJet IIP Plus	398.50/629.00
H-P LaserJet IIi	1529.00
H-P LaserJet III	CALL
H-P Paintjet	673.03
H-P Deskjet 500 Color	899.00
H-P LaserJet IIP	1068.40
CANON BJ10EX Bubble Jet	323.68
CITIZEN GSX 140 Plus	289.44
CMS P-610	1629.00
PACIFIC DATA 25 in 1 Cart. LAS3	299.00
PACIFIC DATA 25 in 1 for Deskjet	99.50
PACIFIC DATA Page Postscript 4 HP LAS3	349.44
PACIFIC DATA Connect 1.2 MB Printer Sharing	332.58
PACIFIC DATA 1 MB for 2P II/III/IIIP	108.40
POSTSCRIPT CART W/2MB HP I/AS2	339.00
CPI JETMEMORY 1MB for HP IIP/II/IIIP	98.60
CPI JETPAGE for HP IIP/II/IIIP Postscript	208.72

DRIVES, TAPES & CARDS

IONEGA B900/B900trans	\$767.80 / \$799.50
PLUS Hardcard IXL 105MB	437.45
PLUS Hardcard IXL 50 MB	296.10
MAXTOR 130 MB IDE	35.90
MAXTOR 340 MB IDE 13MS	989.30

Seagate

ST225 20 MB	\$180.23	SEAGATE ST-2511	\$228.41
ST2302E	1169.50	ST4766E	676 MB
ST1480A 42MB IDE	1279.55	ST351/AT	228.64
ST3144A 130MB IDE 16MS	379.42		
ST1239A 211 MB IDE	596.52		

MICROPOLIS

1684-7 340 MB	\$1109.95
1684-7 345MB HH	985.44
1568 15 676MB ESDI	1358.65

CONNER

CONNER 40 MB / 120 MB	\$199.00/\$363.30
CONNER 84 MB / 200 MB	267.65/548.63
CONNER 174MB	493.10
CONNER 510MB	1269.13

SURGE SUPPRESSORS

PROXIMA Power Torch/Plus	\$49.50/58.60
PROXIMA Power Director P3P/15	83.15/86.52
DATA-SHIELD 585/S100	53.95/59.55
KENSINGTON Master Piece Plus	59.90
TRIPLA TE isobar 4 Outlet/6 Outlet	44.25/47.63

MODEMS & COMMUNICATIONS

intel

2400 Internal	\$137.75	2400 External	\$163.94
2400B MNP	179.95	2400 External MNP	207.69
9600 External	443.40	14 4 External	509.00

PRACTICAL PERIPHERALS

2400 V 42 Int.	\$158.81	2400 Int.	\$78.48
2400 V 42BIS Ext	187.50	2400A	163.63
9600 V 32 Ext	279.10	Pocket 2400	98.00
9600 V 32 Int	266.25	2400 Ext FAX	134.72
2400 Int. Fax Modem	89.50		
14 400 V 32 BIS Snd/Rcv FAX External	394.39		
14 400 V 32 BIS Snd/Rcv FAX Internal	359.10		

HAYES

HAYES OPTIMA 9600 V 32	\$349.50
ULTRA 9600 External	599.98
HAYES OPTIMA 2400	145.00
HAYES Pocket Edition	112.92
ULTRA 144 V 32 External	748.36

Robotics

Counter 2400	\$264.61	V 32 9600E	\$567.80
Dual 14,400 HST	789.65	14 400 HST	657.77
V 32 BIS 96, Int	522.19	SPORTSTER 9600 Ex	359.50
WORLD PORT Modem/Fax External 2496	312.90		

MHZ MEGAHERTZ

2400 for TOSHIBA	\$127.33
CPI VIVA 2400 Internal	78.40
CPI VIVA 2400 External Faxsend Modem	98.40

MULTI-TECH

MULTI-TECH MT932BA 9600	\$497.82
MULTI-TECH MT1432 EAB, 14 4 V 32 BIS	523.33

BOARD & COMM PRODUCTS

ASI 5251 11 Enhanced Local	\$449.75
BOCA 2 Ser/1 Par Port	44.67
SOUND BLASTER PRO	189.28
KINGSTON SX Now 20 MHz IBM 50, 60	299.91
KINGSTON SX Now 20 MHz IBM 50Z	299.91
KINGSTON SX Now 20 MHz AST Prem/Bmo/289	299.91
KINGSTON SX Now 25 MHz IBM 50, 60	418.80
KINGSTON SX Now 25 MHz IBM 50Z	418.80
KINGSTON SX Now 25 MHz AST Prem/Bmo/289	418.80
IRMA II 3270 XT/AT/PS/2	399.60
AST SX/PAK 286 OK	96.60
INTEL AboveBoard Plus 8 w/2 MB	397.71
INTEL onboard 386/PC	459.60
INTEL SataFaxion Fax Board	359.00
INTEL Snap In 386SX/20	359.52

BATTERY BACKUP AND UPS

AMERICAN

AME 1200VX	\$735.95	BACK UPS 800	\$552.50
AME-Smart 400	307.05	AME-800LS	434.68
BACK UPS 250	129.43	AME-Smart 900	609.12
BACK UPS 400/450/600	178.26/219.68/286.84		

BC 275	\$148.41	BC-500 LAN	\$234.43
BC-375	169.26	BC-750 LAN	383.09
BC-1375	218.61	Omni 450 LAN	299.54
BC-1350 LAN	668.21	BC-205	125.89

MICE

ZNIX Super Mouse II W/Windows	\$79.75
LOGITECH ScanMan PC/Scanman 256	177.89/276.45
LOGITECH Trademan Serial	78.62
MICROSOFT Mouse (Bus Version)	95.50
MICROSOFT Mouse (Serial Version)	95.50
MICROSOFT Mouse w/Windows	144.95
MICROSOFT Ball Point Mouse	118.90
MICROSOFT Serial No Software	79.80
LOGITECH Fotoman	48.30
LOGITECH Mouseman Serial	69.35
LOGITECH Mouseman Bus	69.35
LOGITECH Mouseman Cordless	105.54

WINDOWS SOFTWARE

MICROSOFT Windows	\$88.00
MICROSOFT Money	43.95
MICROSOFT Office	439.89
MICROSOFT Publisher	119.20
ADOBE TypeManager for Windows	58.07
ALDUS PageMaker	469.89
ATECH Windows Powerpack	69.82
BERKLEY After Dark for Windows	29.20
BORLAND Office Version 2.0	95.08
BORLAND Turbo C++ For Windows	89.90
CAERIE Omnipage Professional	599.42
CAMERA Wordscan+ for Windows	599.42
Carbon Copy for Windows	269.90
COREL SYSTEMS Corel Draw	349.99
CROSSTALK for Windows	119.85
DELFINA Per Form Pro for Windows	299.84
INTUIT Quicken for Windows	44.95
LOTUS 123 For Windows	365.50
LOTUS Ami Pro Personal for Windows	119.20
LOTUS Freelance	336.30
MICROGRAFX Designer 3.1 for Windows	422.42
MICROGRAFX X-Port for Windows	134.42
MICROGRAFX X-Draw for Windows	89.00
MICROGRAFX Chartmaker	299.92
MICROSOFT C Compiler For Windows	459.12
MICROSOFT Excel for Windows	269.25
MICROSOFT PowerPoint for Windows	269.25
MICROSOFT Project for Windows	409.10
MICROSOFT Word for Windows	292.47
MICROSOFT Word for Windows	269.25
MICROSOFT Works for Windows	119.20
OKNA Windows Desktop	36.48
REFERENCE Grammatik for Windows	57.12
SOFTWARE PUBLISHING Superbase 4 for Windows	399.33
SYMANTEC Norton Desktop for Windows	93.33
SYMANTEC On Target	258.17
SYMANTEC PCAnywhere IV	96.60
WORDPERFECT 6.0 for Windows	119.20
WORDPERFECT for Windows Upgrade	75.95
XEROX Ventura Gold for Windows	469.25
ZSOFT Soft Type Fonts	108.86

VIDEO PRODUCTS</

Memory: 1MBSIMM-\$35

Printer Buffers

Lowest Prices! Minimum Five-Year Warranty!
If you don't see everything you want, PLEASE CALL us.



Add RAM for only \$35 per MByte!

SIMM modules—easy plug-in (add \$3 for SIPP)
1 MB x 9: 70ns/\$46 80ns/\$40 100ns/\$35
4 MB x 9: 80ns/\$149

Toshiba

T1000LE/SE: 1M/\$129 2M/\$169
T1600, T3100SX/E, T3200SX: 2M/\$109 4M/\$189
T1200KE, T5100, T5200, T8500: 2M/\$113

COMPAQ—always fully compatible

DeskPro 386/20e/25e, 386s memory exp. boards
1M/\$118 4M/\$249
DeskPro 286N, 386N/20e/25e/20/25/320 mods
1M/\$64 2M/\$99 4M/\$199

System Pro 386/33/33L, 486/25/33L modules
2M/\$119 8M/\$395
LTE286 1.6M/\$79 2.6M/\$119 4.6M/\$217
LTE 386/20 1M/\$149 2M/\$289 4M/\$329

AST fully compatible memory

P286/12 386, IC, PE286/20 1M/\$85 4M/\$269
PIE386SX/20 P386SX/16/33/33T/TE 486 modules
1M/\$69 4M/\$219

Cyrix Math Coprocessors beat Intel's

for 386SX 16MHz/\$139 20MHz/\$149
for 286—all clock rates. only \$95

BocARAM boards, LIM-EMS compatible

XT, 8-bit easy plug-in 1M/\$149 2M/\$199
AT Plus, DIP (BMB cap.) 2M/\$199 4M/\$289
AT Plus, SIMM (BMB cap.) 2M/\$229 4M/\$349
AT V/O + (w/ ser & par ports) 2M/\$249 4M/\$369
BocARAM MCA 32 for PS/2 0M/\$125 4M/\$315
Zenith Supersport 286/E/SX/Simline 1M/\$125

IBM PS/2 easy memory expansions

Boost performance with fast RAM memory modules
for your PS/2 systemboard. Add-on RAM starts at:

1M/\$52 2M/\$93 4M/\$225
Expansion board (2-BMB or 2 14MB cap.) 2M/\$299
Expansion board (4 16MB capacity) 4M/\$489

Additional 2MB for above boards from \$73
Additional 4MB for above boards from \$225
L40SX Laptop 2M/\$129 4M/\$239 8M/\$499

H-P LaserJet II, IID, IIP, III, and IIID

All memory boards are 100% H-P
compatible and easily expandable 2M/\$115
up to 4MBytes by adding chips 4M/\$189
Re-manufactured cartridges \$59.95

IBM 4019/4019e 1M/\$99 2M/\$139 4M/\$209

Pan 4420/501 1M/\$105 2M/\$149 4M/\$219

Slotless Clock Chip 28-pin for ROM socket \$34

Add a 32K buffer to your printer and free your computer for important work! Easy-to-install
TENEX buffer chip just plugs into a socket waiting inside your printer. Satisfaction guaranteed!
Five-Year Warranty! Huge Savings! Easy instructions included

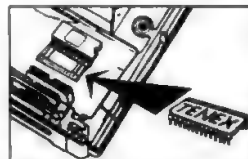
Panasonic

KX-P1124, 1124L, 1123, 1180, 1180L, 1092L, 1191,
1524, 1592, 1595, 1624, 1695, 2180, 3130

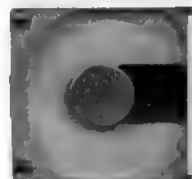
Citizen

GSK-140 and GSK-145 printers

\$39⁹⁵



CD-ROM Caddy



\$11⁹⁵

New!

End fumbling and protect your CD-
ROM library! Get one for each disk

FREE: PC Upgrade Catalog!

Don't miss out! Call now for your free TENEX catalog with thousands of
great, easy PC upgrade ideas at terrific savings! We have \$millions in in-
ventory and 400,000 satisfied customers over our 10 years. **Thanks!**

TENEX
Computer Express

U.S. shipping & handling \$5.00
P.O.s & dealers welcome.
Prices & availability may vary.

56800 Magnetic Drive
Mishawaka, IN 46545

No fee for V, MC, Discover!



Toll Free
USA & Canada

1-800-776-6781

International: 219-259-7051 FAX: 219-259-0300

P3Y

CIRCLE 306 ON READER SERVICE CARD

486-50 Mhz \$ 2,249.00

- 4 MEG RAM, 70 nsec
- 256 K Cache, 20 nsec
- 1.2 Floppy Drive, 5.25"
- 1.44 Floppy Drive, 3.50"
- 14" SVGA Monitor, .28 dp NI
- 16 Bit SVGA card, 1 Meg

- 120 Meg IDE HD, 15 ms
- 2 Serials, 1 Parallel Ports
- Desktop Case, 230 Watts
- 101 Enhanced Keyboard
- MicroSoft DOS 5.0
- 8 Expansion Slots

Same Configuration As Above

486DX-33 MHz, 128 K Cache	\$ 1,945.00
386DX-33 MHz, 64 K Cache	1,595.00

One year warranty on parts and labor

Quality computer systems built to exacting standards from the highest quality components available

sci

Call for Custom Configuration

HOUSTON, TX 77078
FAX: 713-528-0722

Sales: 1-800-526-0550 In Texas: 713-526-0550

CIRCLE 082 ON READER SERVICE CARD

AMERICA ONLINE: It's So Good, It's FREE.

AN EXCITING NEW WORLD OF COMPUTING IS JUST TWO SNIPS AWAY.

Clip and return this coupon, and we'll send you—absolutely free—everything you need to start using America's most exciting online service: America Online. We're so sure you'll love America Online, we'll give you the software you need to get started, a free trial membership and free connect time so that you can explore this fascinating new world of information, computing support, entertainment and personal enrichment.

EASY TO USE, YET POWERFUL.

A unique point-and-click environment lets you navigate through America Online's many services quickly and efficiently. You'll be an expert in no time.

Get fast answers from hardware and software developers, reviewers, and computing experts. Scan for objective reviews on thousands of computing products. Browse software libraries filled with thousands of programs you can choose and use offline. Novice or pro, America Online will enhance your computing experience.

You'll profit from America Online in other ways, too. Send and receive electronic mail with ease. Get nightly homework help for the kids. Manage your investments. Get the latest news and weather. Join special interest groups and clubs. Save time and money shopping. Find and book the lowest fares. Entertain yourself with games, quizzes, movie and book reviews, horoscopes, soap opera news, and much more.

DON'T DELAY—

ORDER YOUR FREE SOFTWARE NOW!

Find those scissors, clip the coupon, and get ready to enter an exciting new world of computing.



HURRY! RESPOND BY 6/30/92!

☐ YES! Send me the free software and trial membership. I understand there's no risk—if I'm not completely satisfied, I may cancel without further obligation.



NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

() _____

HOME PHONE _____

DISK SIZE: ☐ 3.5" ☐ 5.25"

You must have ☐ a PC/XT or higher; ☐ 512K memory or higher; ☐ a hard drive; ☐ a mouse; ☐ a modem; ☐ EGA or Hercules monitor or above to use America Online.



How Many of These America Online Services Could You Use—Right Now?

- ☐ Stock Quotes and Portfolio Management
- ☐ More Than 15,000 Software Files and Programs
- ☐ Fast, Easy Downloading
- ☐ Searchable Online Encyclopedia
- ☐ Powerful Electronic, Fax, and U.S. Mail Capabilities
- ☐ Microsoft® Small Business Center



- ☐ Multi-Player Graphic Games
- ☐ Access to Computer Industry Experts
- ☐ Special Interest Groups and Clubs
- ☐ Graphic Windowing Interface
- ☐ Homework Help and Tutoring Sessions

Mail this coupon in today for your **FREE** trial of America Online!

NO POSTAGE
NECESSARY IF
MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 8098 VIENNA, VA

POSTAGE WILL BE PAID BY ADDRESSEE



8619 Westwood Center Drive
Vienna, VA 22182-9806



HURRY! RESPOND BY 6/30/92!

FREE TRIAL! FREE SOFTWARE!

☐ YES! Send me the free software and trial membership. I understand there's no risk—if I'm not completely satisfied, I may cancel without further obligation.



NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

()
HOME PHONE _____

DISK SIZE: ☐ 3.5" ☐ 5.25"

You must have ☐ a PC/XT or higher; ☐ 512K memory or higher; ☐ a hard drive; ☐ a mouse; ☐ a modem; ☐ EGA or Hercules monitor or above to use America Online.

Clip and mail to:
America Online
8619 Westwood Center Drive
Vienna, VA 22182

America Online is a registered service mark of America Online, Inc.
Microsoft is a registered trademark of Microsoft Corporation.

First Source will give you great memories!

LAPTOP MEMORY

APPLE		SANYO	
Powerbook	Call	Notebook Memory	
AST		TOSHIBA	
Executive Notebook		T1000SE/LE/XE,	
1MB	\$79	T2000SX, SXE	
4MB	\$209		
COMPAQ		11200XE, T3100E, T1600	
Portable LTE 386S/20		T3100SX, 3200SX, SXC	
1MB	\$149	2MB	\$119
4MB	\$339	4MB	\$169
Portable LTE 286		T3100SX, 3200SX, SXC	
2MB	\$189	2MB	\$119
4MB	\$219	4MB	\$169
SLT-286		T3200	
4MB	\$399	4MB	\$209
SLT-386		T4400, T6400	
4MB	\$299	2MB	\$229
LTE Lite 20/25		4MB	\$439
4MB	\$489	8MB	\$699
GRID		T8100	
1500 Series		2MB	\$119
4MB	\$349	4MB	\$169
IBM		T8200, C, T8800	
LA05X, N335X Portable		2MB	\$119
2MB	\$119	4MB	\$169
4MB	\$209	8MB	\$439
8MB	\$409	ZENITH	
NEC		MasterPort 386SL/SX	
UltraLite III		2MB	
2MB	\$219	SimPort	
4MB	\$479	1MB	
8MB	\$949	1MB	
UltraLite SX/20		SupersPort 286, 286e,	
2MB	\$279	SupersPort SX	
4MB	\$819	2MB	
UltraLite SL/20		TurboPort 386, 386e	
2MB	\$229	1MB	
4MB	\$499		

SIMM MODULES

IBM COMPATIBLE TYPE

4M x 9-80	\$145
1M x 9-80	\$40
1M x 9-53 (for Zeos systems)	\$69
256 x 9-80	\$15

IBM MEMORY

PS/1	
2MB	92F9935 \$109
PS/2 30-286, Exp. Board 1497259	
2MB Kit	30F5360 \$105
PS/2 386SX, LS, 405X, 502, 555X, L565SX, LS, 70	
1MB	6450603 \$59
2MB	6450604 \$99
PS/2 555X/LS, 655X/LS, 34F3077 and 3011	
4MB	34F2933 \$189
PS/2 385X, LS and 405X	
4MB	6450129 \$439
PS/2 70-A21, A61, B21, B61	
2MB	6450608 \$99
PS/2 90, 95 and P75 (install in pairs)	
4MB	6450128 \$199
Expansion boards for 50, 502, 555X, 60, 655X	
2-8MB w/2M	1497259 \$299
2-8MB w/4M	1497259 \$399
Expansion boards for all models 70 and 80	
2-14MB w/2M	34F3077 \$349

LASER PRINTER MEMORY

Hewlett-Packard LaserJet IIP, III, IIP and IID	
2MB	334758 \$125
4MB	334778 \$199
Hewlett-Packard LaserJet IISI	
4MB	C2065A \$189
Hewlett-Packard LaserJet IIP and IID	
2MB	334448 \$125
4MB	334458 \$195
IBM Laser 4029	
2MB	1183334 \$169
4MB	1183335 \$289
Panasonic 4450i and 4420	
2MB	KX-P441 \$149
4MB	PN N/A \$239
Epson ActionLaser II	
2MB	PN N/A \$279

EXPANSION BOARDS

BocaRam/AT Plus

Up to 8MB for any AT 286 386 compatible machines running up to 33MHz. Conventional Expanded and Extended provides a maximum of 8MB LIM/EMS 4.0.

2MB with DRAM's	\$199
2MB with SIMM's	\$219

SX/NOW! PROCESSOR UPGRADE

Don't replace your system... Upgrade your 286 to a 386 with Kingston's SX/Now!

SX/Now! features:

- ✓ 16K bytes of Cache memory
- ✓ 8086/586 Co-Processor Support
- ✓ Requires No expansion slot
- ✓ Onboard 20 MHz clock
- ✓ 5 year warranty

Kingston
Microcomputer Corporation

Now available for:

- ✓ IBM PS/2 25/286 30/286 50/502 and 60
- ✓ IBM Original AT & XT/286
- ✓ AST Prem. 286 & Bravo 286
- ✓ HP ES286/12 and ES/8
- ✓ Epson Equity Ite and II Plus
- ✓ NEC Powermate 286 Plus and Portable Plus
- ✓ AGI 1800A 1800B & 1800C
- ✓ Compaq Port III/DeskPort 286

SX/Now! 20MHz/25Mz \$389/\$459

AST MEMORY

Premium 386C and 386-16	
4MB Kit	500510-008 \$189
Premium 386-20	
4MB Kit	500510-004 \$249
Premium 486 and 486/33	
2MB	500718-004 \$129
Premium II 386SX/16, 20, 25, 33 & Cupid 32 card	
1MB	500780-003/500718-002 \$69
4MB	500780-004 \$209

COMPAQ MEMORY

DeskPro 286-E, 386-20/20E/25	
1MB	113131-001 \$89
4MB	113132-001 \$199
DeskPro 386S/16	
1MB	113545-001 \$89
4MB	112534-001 \$199
DeskPro 286N, 386N, 386SX/20, 386/25M, 486/33M, 486e/25M, 486e/16M; SystemPro LT, 486SX/25S, 386/25S and Portable 486c.	
2MB	118689-001 \$99
4MB	118690-001 \$199
DeskPro 386-33, 486-33 & SystemPro	
2MB	115144-001 \$129
8MB	116561-001 \$419

FIRST SOURCE
INTERNATIONAL, INC.

"The Only Source for Computer Memory!"

Toll Free from anywhere in the U.S. or Canada

1-800-535-5892

Outside the U.S.

714-588-9866

Fax Line

714-588-9872



Send P.O.'s and Mail Orders to:
First Source International, Inc.
36 Argonaut, Suite 140
Aliso Viejo, California 92656

DELIVERY GUARANTEED

Follow your package every step of the way with 3 day international delivery via Federal Express, UPS, or DHL! Inexpensive, dependable delivery anywhere in the world.

PRICE, QUALITY, AND SUPPORT

- Same day shipping
- Free technical support
- Overnight & Saturday delivery available
- All products user installable
- No surcharge on Visa/MC/Discover
- APO/FPO international orders welcome
- Purchase orders accepted from Gov't Agencies, Universities & Qualified Firms

TERMS AND CONDITIONS

- NO SURCHARGE ON VISA, MC, or DISCOVER
- Terms: American Express (add 4%) Visa/MC Discover C.O.D. P.O.s
- 20% Restocking fee on all non-defective returns & refused orders. All items must be returned within 15 days with original packaging. (DRAM required)
- Manufacturer's part numbers are for your convenience. All products third party 100% compatible or full refund!
- Prices and availability subject to change
- We will beat any advertised price! valid only on identical brands, offer not good for SIMM's or DRAM

PCMO9

Circle 382 on Reader Service Card (Resellers: 320)

POWER to SHARE your Printing Resources

Model	Ports	PCs/ Printers	Memory Available	Priced From
SL	6 Ser/4Par	Any Combination	256KB-4MB	\$495
SLP	8 Par/2 Ser	Any Combination	256KB-4MB	\$495
HXS	4 Serial	Any Combination	256KB-16MB	\$295
HXM	2 Ser/ 2 Par	Any Combination	256KB-16MB	\$295
HWP	5 Parallel	3/2, 4/1	256KB-16MB	\$295
HXP	4 Parallel	2/2, 3/1	256KB-16MB	\$245
HCP	2 Parallel	1/1	256KB-16MB	\$225
AS31	4 Parallel	3/1	None	\$175
AS41	5 Parallel	4/1	None	\$195
AS81S	9 Ser/ 1 Par	8/1	None	\$189

Now every member of your team can have access to all of your printing resources with Printer Sharing Devices from Buffalo Products.

BUFFALO

US & CANADA Toll-Free
(800) 345-2356

Fax (503) 585-4505

Technical Support (800) 345-2027

Buffalo Products, Inc.

2805 19th St. SE, Salem, OR 97302-1520

CIRCLE 328 ON READER SERVICE CARD

An opportunity
to purchase copies
of back issues of
PC TECH JOURNAL.

For further
information contact:

Back Issue Department
1 Park Avenue, 5th Floor
New York, New York 10016
Attn: Angela Accetta

SEND NO MONEY NOW.

Arlington Computer Products... Great Prices and Service Since 1984!

- PC Magazine "...Arlington offers worry-free mail order purchasing!"
- PC Sources Product Review "...You can be confident that what you order will work as soon as it arrives!"
- PC Computing Phantom Shopper "...Courteous service and terrific technical support!"

HEWLETT-PACKARD

Laserjet III w/Toner	\$1545
Laserjet IIP+ w/Toner	\$809
Laserjet IIP w/Toner	\$1079
1MG Upgrade	\$89
2MG Upgrade	\$119
4MG Upgrade	\$199
Extra Toners	\$79
Deskjet 500/500C	\$409/739
Pacific Page/XL	\$279/\$649
Pacific Data 25 in 1 Font ..	\$249
PacData Deskjet 25 in 1 ...	\$99
Pacific Connect	\$269

PANASONIC

1123 ..	\$199	1695 ..	\$369
11241 ..	\$275	2624 ..	\$365
2123 ..	\$249	4410 ..	\$649
2180 ..	\$179	4430 ..	\$899
1624 ..	\$339	4450I ..	\$1079
1654 ..	\$519	4455 ..	\$1719
4420/4450I 2 MG...	\$149		

CANON

BJ-300	\$439	BJ-330	\$589
BJ-10EX...	\$319		

OKIDATA

ML320	\$315	ML391 ..	\$589
ML321	\$439	ML393 ..	\$919
ML380	\$219	ML393C ..	\$999
ML390	\$439	PM3410 ..	\$1299
OLC400 ..	\$609		
OLC820 ..	\$1239		

CITIZEN

GSX140+ ..	\$299	GSX200 ..	\$159
GSX145 ..	\$379	PN 48 ..	\$289



ML-390

EPSON PRINTERS

LX810	\$155	LQ570	\$255	LQ1070 ...	\$349	EPL 7500 ..	\$1899	DFX8000	\$2139
FX850	\$289	LQ860	\$549	LQ1170 ...	\$575	EPL8000 ..	\$1329	Action Laser II-	\$679
FX1050	\$379	LQ870	\$435	LQ2550 ...	\$849	DFX5000 ..	\$1269	Action 150 Fonts.	\$59

Accessories for Epson Printers and Lasers in Stock!

NOTEBOOKS

Arlington 386 SX20,	
60 MG, VGA	\$1799
AST 43V, 386, 40 MG ..	\$2049
AST 63V, 386, 60 MG ..	\$2299
Epson NB3S, 40 MG ...	\$2199
Panasonic CF270,	
16 MHz, 20MG, VGA ...	\$1499
Panasonic CF270,	
16 MHz, 60 MG, VGA ..	\$1749
Panasonic CF370H6	
386SX-20, 60MG, VGA ..	\$2499

TEXAS INST.

TM 2000/20 MG	\$969
TM 2000/40 MG	\$1199
TM 3000/40 MG	\$1899
TM 3000/60 MG	\$2249
TM 3000/WINSX 60	\$2559
TM 3000/WINSX 80	\$2895
LASER STD	\$879
LASER PS17	\$1199
LASER PS35	\$1499
LASER 1 MG Upgrade ..	\$129

SOFTWARE

Aldus Pagemaker	\$489
Corel Draw	\$369
Lotus 123 2.2/3.1 ..	\$329/\$389
Microsoft Mouse	\$89
Microsoft Excel	\$299
Microsoft Windows 3.0 ...	\$79
Microsoft DOS 5.0	\$79
Ventura Desktop Publ. ..	\$499
Word Perfect 5.1	\$245
Word Perfect Windows ..	\$269

SCAN. & DIGIT.

Epson ES300C	\$829
Kurta XLP	\$249
Logitech ScanMan	\$139
Panasonic FXRS 3070U ..	\$769
Summasketch 12x12	\$289
Summasketch 12x18	\$539

MULTIFUNCTION BOARDS

AST 6 Pack w/384K	\$159
Irma Board III	\$399
AST 5251-II Plus	\$449
Sound Blaster PROF	\$189

intel

Intel Above Board+	\$239
Intel Plus 8 w/2 MG	\$349
Intel 386 PC w/1 MG	\$249
Intel Satisfaxtion	\$329
Intel Scanner Option	\$199
Intel Snap-In 386	\$339

DRIVES & TAPES

Ext. 1.2 for PSII	\$159
Toshiba 3 1/2" 720K	\$69
Toshiba 3 1/2" 1.44	\$69
Colorado Jumbo 120	\$209
Colorado Jumbo 250	\$269

CD ROM OPTICAL DISKS

NEC CDR-73	\$579
Panasonic LK-MC 501B ..	\$369
Panasonic LK-MC 501S ..	\$539

SEAGATE HARD DISKS

48 MB 3 1/2 (157N-Kit) ...	\$259
40 MB for AT (ST251-1) ..	\$239
80 MB for AT (4096)	\$369
80 MG 296 Kit	\$299
89 MG 3096	\$279
106 MG 3120A	\$369
120 MG 3144A	\$379
211 MG 1239	\$569

IOMEGA

90 MB Int. w/boot card ..	\$979
90 MB Ext. w/boot card ..	\$999

PLUS HARD CARD

40 MB/50 XL	\$549/\$299
80 MB/105 MB	\$419/\$449

CONNOR HARD DRIVES

40 MB	\$199
120 MB	\$359
200 MB	\$589

MODEMS

Dove Fax Modem DOS ..	\$179
Dove Fax Windows	\$209
Hayes Pocket 2400	\$119
Hayes 2400 Ext.	\$289
Hayes Optima 96	\$379
Hayes Ultra 96	\$599
Hayes Ultra 96 14.4	\$759
Intel 2400 Ext.	\$159
Intel 2400 Ext. MNP	\$209
Intel 9600 Ext.	\$439
Intel 9600 14.4 Ext	\$479
Practical Per. 2400 Ext. ..	\$119
Practical Per. 9600	\$265
Practical Per. 9600 14.4 ..	\$359
Everex 2400	\$79
TI 2400 Fax/Modem	\$279
US Robotics 9600	\$569
US Robotics Dual Std ...	\$769

CHIPS

256K/1 MG Chips. each	\$3/\$6
256 x 4 Chips	\$6
256K/1MB Simms	\$15/\$49
4MB Simms	\$149
Compaq 386 4 MB	\$239
Compaq LTE 2MB	\$159
Compaq LTE 386 4MB ..	\$299
HP 2MG Upgrade	\$119
IBM 2-8 MG Board	\$279
IBM 70 & 80 2 MB	\$119
IBM 70 & 80 4 MB	\$219
OKI Laser 2MB	\$149
TI Notebook 2 MG	\$139

intel

Intel 8087-2	\$109
80287-10XL/XLT	\$89
80387-16	\$195
80387 SX-16	\$129
80387 SX-20	\$135
80387-20/25/33	\$195
80487 SX	\$449

NETWORKING

Netware 2.2 5 User	\$499
Netware 2.2 10 User ...	\$1099
Netware 2.2 50 User ...	\$1999
Lantastic 10BPS Starter ..	\$459
E143 Ethernet	\$199
NE1000 Ethernet	\$139
NE2000	\$159
Ethercard +/-16	\$139/\$165
EtherLink II 3 Com	\$185
Intel Ether 16	\$119
IBM Token Ring	\$599

VIDEO BOARDS

ATI VGA Wonder XL	\$179
ATI VGA Wonder 512 ...	\$199
ATI 8514 1MG	\$409
ATI Graph Ultra 1MG ...	\$479
Boca Super VGA	\$129
1024 VGA 16 Bit	\$79
NEC Grph Engine 256 ..	\$849
Orchid Pro II 1MG	\$269
Orchid Fahrenheit 1MG ..	\$329
Paradise VGA 1024	\$139

MONITORS

MITSUBISHI

EGA	\$249
VGA XC1429	\$379
Diamond Scan	\$489
HL6615 16"	\$969
HL6945 20"	\$1789

NEC

3 FGX/4 FGX	\$639/\$749
5 FGX	\$1349
Multisync VD	\$1999

PANASONIC

1381 VGA 1024x768	\$329
1395 VGA 1024x768	\$439
1991 VGA 1280x1024 ...	\$1559

GOLDSTAR

EGA/VGA 1425+ ...	\$249/\$249
VGA 1460	\$299
VGA 1620+	\$689

Arlington
Computer
Products, inc.

Prices and availability subject to change
without notice. Purchase orders accepted
from qualified customers.

HOURS C.S.T.
9:30 - 6:30 pm Mon-Fri
9:30 - 1:30 pm Saturday

1970 CARBOY
MT PROSPECT, IL 60056

FOR ORDERS & QUOTES

800-548-5105

CUSTOMER SERVICE AND IN ILLINOIS 708-228-6333

SHIPPING 708-228-9748

TECHNICAL ASSISTANCE 708-228-1470

We Export! FAX 708-228-0516

No surcharge for Charge Cards.

CIRCLE 336 ON READER SERVICE CARD

PACIFIC WAVE

PACIFIC WAVE TECHNOLOGY

SPECIALIZING IN INTERNATIONAL ORDERS

In Hawaii.....(808) 875-1100
Shipping & Technical Assistance
1 (808) 875-1108
FAX.....(808) 875-0061



1 (800) 348-4727



1 (800) 348-4727



0031-11-1865

通訳サービス (1分 \$3.50)



0014-800-126-943



0130-816218

Dolmetscher für \$3.50 pro Minute



0800-89-4935

COMPUTERS

IBM PS/2
1.40 SX 2199
PS/2 Mod 35 SX/40Mb 1450/1850
PS/2 Mod 40 SX 40/80 Mb 1995 2195
PS/2 Mod 50 Z 60 Mb 1250
PS/2 Mod 55 SX 40/80 Mb 1995/2100
PS/2 Mod 57 SX 80/160 Mb 2895 3100
PS/2 Mod 70 A81/A16 3790/3990
PS/2 Mod 80 80/160/320 3275/3625/5075
PS/2 Mod 90/95-486 Call

COMPAQ
LTE 386 SX 30/60/84 3395/3735/Call
DPro 386 S 20 Mod 1/40 Mb 1655/2150
DPro 386/25 M (All Models) Call
DPro 386/33 M (All Models) Call
DPro 486/33 M (All Models) Call

TEXAS INSTRUMENTS
Travelmate 2000 20 Mb 969
Travelmate 3000 40/60/80/120 1850/2190/2500/2795
Travelmate 3000 Win SX 60/80/120 2499/2799/3300

AST
Premium Exec Notebook 386/20 60/80 Mb 2249/2499
Premium Exec Notebook 386/25 60/80 Mb 2525/2799
Premium Exec Color Call
Premium II 386 SX/20 1275
Premium II 386/33 2199
Premium II 486 SX/20 2299
Premium II 486/33 3450

TOSHIBA
T2000 SX 40/60 Mb 1800/2050
T2000 SX1 40/60 Mb 2400/2600
T2200 SX 60/80 Mb 2600/2800
T3200 SX Color 5695
T3300 SL 3200
T4400 LCD/PDP 4400/4650
T5200 100/200/Color 3250/4600/4199
T6400 Call

DFI (complete systems)
286-12 Mhz/40 Mb VGA 1090
386 SX-20 Mhz/40 Mb VGA 1199
386-33 Mhz/40 Mb VGA 1595
486-33 Mhz/40 Mb VGA 2595
1-year on-site warranty
Call for Custom Configurations

MONITORS & TERMINALS

MONO/COLOR
IBM 8504/8512 199/439
Samsung RGB 200
Samsung 14" VGA Mono 129
Amber 12" TTL 85

VGA/EGA MONITORS
IBM 8506/07/08 899/629/928
IBM 8513/15 499/699
Samsung 17" VGA 865
Mitsubishi TGA 329
Mitsubishi 1381/HL6935 485/1900
NEC 3FGX4FG 640/759
NEC 51G4FG 1399/2995
Packard Bell 8541/8528 290/339
Panasonic 1381/1391 369/459
Sony CPD 1304 599
Zenith 1492 595

VIDEO BOARDS

ATI Vantage 1 Mb 385

ATI 8514/Ultra 1 Mb 375
ATI Graphics Ultra 1 Mb 439
ATI VGA Wonder XL 256 k 175
Hercules GB 1024/1024+2 532/609
NEC Graphics Engine 895
Orchid ProDesigner II 512/1 Mb 186/230
Orchid Farenheit 1280 1 Mb 336
Paradise VGA+/16 122/145
Paradise VGA 1024 256/512 159/199
Herz Monow Parallel Card 45
VGA 1024 256/512 109/139

PRINTERS

CANON
BJ 10 EX 320
BJ 300/330 439/599

CITIZEN
GSX 130/140/145 259/299/399
PN 48 Bundle 339

EPSON
FX 850 289
FX 1050 389
LQ 200 225
LQ 570 258
LQ 870 445
LQ 860 549
F5300 Color Scanner 1049

HEWLETT-PACKARD
LaserJet 340/Color 1489/2499/Call
LaserJet 350 3525
LaserJet 2P+/CP 810/995
DeskJet 500/Color 399/729
ScanJet + w/f 1069
ScanJet IIC Color Scanner 1495
PamJet XL 695 1580
HP Options Call

POINTS & MEMORY
Pacific Data 25-1 III/DeskJet 259/109
Pacific Data 1/2/4 Mb 129/159/265
Pacific Page Plus XL 349/721
Pacific Data Plotter in a Ctg 239
LaserJet Memory 1/2/4 Mb 119 149/245
Compaq 1-4 Mb Modules 118 383
IBM/T1/Toshiba/AST Call
CPI Superset 425 220
CPI DeskRam 256k 125
CPI 60 Font DJ500 109

IBM
Laser Printer 5E/6 1159/1435
Laser Printer 10/10i 1661 2200
Laser Printer Options Call
IBM 2390/2391 340/460

NEC
Silent Writer 290/990 2450/2895
Silent Writer 2 Mod 95 1549

OKIDATA
ML 184 215
ML 320/321 324/435
ML 390+/391+ 444/599
ML 393+/393+color 919/999
Okilaser 400/800 609/929
Okilaser 820/830/840 1276/1325/1949

PANASONIC
112/1180 214/149
1124/1624 279/340
1654 1695/2624 538/664 479
2123/2124 250/Call
2180 181
4410/4430/4450/4455 Laser 675/899/1129/1883

TEXAS INSTRUMENTS
PS 17 Laser 1198

PS 35 Laser 1498

TERMINALS

Wyse 50/60 375/400
Wyse 30/85 310/339
Wyse 150/165 289/379

SOFTWARE

Aldus Pagemaker 4.0 495
Ashton Tate dBase III+/IV 419/479
Borland Quattro Pro 3.0 302
Carbon Copy 6.0 110
Clarion Prof. Developer 450
Compaq/IBM DOS 5.0 89/125
Harvard Graphics 3.0 370
Lotus 1-2-3 2.3/3.1 329/399
Microsoft All Titles-Lowest Price
Microsoft Office-Windows 479
Microsoft Windows 3.0 93
Microsoft Word Windows 299
Microsoft Word Windows 127
Norton Util 6.1 114
Procomm Plus V2 62
Quicken 5.0/Windows 39/45
Ventura Publisher V 3.0 479
WordPerfect 5.1/Windows 260
1200 Additional Titles In Stock

PLOTTERS AND DIGITIZERS

HEWLETT-PACKARD
7475A/7550B 1349/2699
7570A/7575A 2699/3350
7576LXI 4150

SUMMAGRAPHICS
Summasketch 2 12X12/12X18 335/515

CALCOMP
Pacesetter 2000 3150/3995
12X12 12X18 298 597

MULTIFUNCTION BOARDS CARDS & CHIPS

IBM 5250 1-malation 695
AST 5251 1-malation 499
AST 6-Pack w/384 k 145
Intel AboveBoard Plus w. 512 k 289
Intel InBoard 386 PC 492
Intel 89287-XL 99
Intel 80387-SX Call
Intel 80387-DX Call
Cvrix Fasmath Call

MODEMS & COMMUNICATIONS

ATI 9600 ETC 399
CPI 2400 Internal 69
CPI 2400 Ext Fax 123
CPI 2400 Ext MNP 154
CPI 9600 Ext 329
Everex 2400/2400 MNP 99/164
Hayes 2400/2400B 289/218
Hayes Ultra 96 609
Hayes Ultra 144 760
Practical Pocket Modem 99
Intel 2400/9600 217/454
MegaHertz Laptop Modems Call
Practical Perif 2400/9600 132/479
US Robotics Cour HST 550/585
US Robotics Dual Std 760/779

FAX MACHINES

Sharp FO 216/240/334 559/699/795
Intel Satisfaction/MCA 369/421
CPI 2496 IF 139
US Robotics World Port 2496 315
Megahertz Pocket 2400 S/R Fax 259

MICE

Logitech C9 Bus PS2 82
Logitech Mouseman 72
Logitech Scannman/PC/PS2 169/240
Microsoft Mouse+Windows 3.0 103/145
Microsoft Ballpoint 118

DRIVES & TAPES

Colorado DJ10/20 215/275
Conner 40/105/210 199/345/550
ST 225 189
ST 351 AX Call
Plus II X150/105 299/450
Mountain All Models Call
Panasonic LF 7010 1 Gb 2840
Erasable Optical Drive 199
Procom Ext 5.25 PS2 199
Procom PS2 Hard Drive 120/200 Mb 199
Procom Laptop Floppy 199

NETWORK

ARTISOFT
Lantastic 2 Mb Starter Kit 338
Lantastic 2 Mb Adapter 139
Lantastic 10 Mb Starter Kit 469
Lantastic AL3 Starter Kit 539
Lantastic 10 Mb Adapter 199

NETWARI
Netware 2.2 5-User 489
Netware 2.2 10-User 1149
Netware 3.11 5-User 695
Netware 3.11 10/20-User 1395/1995
Netware 3.11 100-User 3900
NE 1000/NT 2000 159/179
NI/2 NI 3200 (EISA) 249/749
SMC

Arctnet PC 130 8 Bit 99
Arctnet PC 500 16 Bit 289
Arctnet PC 500 16 Bit 179

MISC. & ACCESSORIES

Most orders shipped insured next or second day air. **FREE** 24-hour worldwide order tracking. Printer orders received by 5 PM CST can be shipped same day. All credit card and COD orders checked electronically. We accept Amex, Visa, MC, JCB, Discover, Diners Club, Carte Blanche, CODs, Wire Transfer. **TERMS & LEASE AVAILABLE** (one day approval). Credit cards not charged until product shipped. **GOVERNMENT AND EDUCATIONAL P.O.'S ARE WELCOME.** Allow 10 days for personal checks to clear. Prices reflect a 3 percent cash discount. Non-defective returns subject to a restocking charge. All warranties good through Paradise Computer Products. Prices subject to change without notice. All freight charges to be incurred by purchaser for refused COD shipments. Please allow 24 hours on large credit card orders. **HOURS: 8:30 AM TO 8:30 PM CST MON-FRI, 10 AM TO 4 PM CST, SAT.** **PACIFIC WAVE TECHNOLOGY P.O. BOX 840312 DALLAS, TX 75284-0312**



PC's and MORE^{INC.}

Your Mail Order SuperStore™

Mon - Friday 9:00 - 9:00 Saturday 10:00 - 12:00 Sunday Closed Eastern and Mountain

LapTops and More...

Apple

PowerBook 100 - 4/40	\$2179.00
PowerBook 140 - 4/40	\$2899.00
PowerBook 170 - 4/40	\$3899.00

Toshiba

T2000 - 40 Mb HD	
T2000 SX - 40 Mb	
T2200 SX - 60 Mb, VGA	
T3200 SX - 120 Mb HD	

Premium Exec. 386 (12 khz) Call
with 20 MB internal HD, grey scale

Premium Exec. 386 SX (25 khz) Call
with 60 Mb internal HD, color

Premium Exec. 386 SX (25 khz) Call
with 60 Mb internal HD, grey scale

Premium Exec. 386 SX (20 khz) Call
with 200 Mb internal HD, grey scale
also Compaq, NEC, TI and more!

Printers and More...

IBM

ML 320 - Dot Matrix	\$339.00
ML 321 - Dot Matrix	\$449.00
ML 380 - Dot Matrix	\$235.00
ML 390 - Dot Matrix	\$459.00
ML 391 - Dot Matrix	\$629.00
ML 393 - Dot Matrix	\$989.00
ML 393c - Color Dot Matrix	\$1069.00
OLC 400 - 4ppm, Laser Printer	Call
OLC 800 - 8ppm, Laser Printer	Call

Hewlett Packard

LaserJet III - 4ppm, Laser Printer	
2P Laser Printer	
LaserJet IID	
H.P. DeskJet 500 - (ink)	
LaserJet IIP - 4ppm	
LaserJet IISI - 17 ppm	

Epson

LQ-570 24-PIN, Narrow	\$279.00
LQ-870 24-PIN, Narrow	\$469.00
LQ-1170 24-PIN, Wide	\$649.00
FX-850 9-PIN, Narrow	\$314.00
FX-1050 9-PIN, Wide	\$449.00
EPL-7500 Laser Printer	Call
Action Laser II	Call

Canon

BJ 300	\$469.00
BJ 330	\$639.00
BJ 10EX Portable	\$339.00

QMS

PS-410 4ppm	\$1629.00
PS-815 8ppm	\$2995.00
Model 30i	\$8499.00
Model 10	\$8299.00

Panasonic

4450i	Call
4455 Post Script Laser	Call

Australia 0014-800-128-806

France 05-90-0581

Germany 0130-8-16024

Netherlands 06-022-2383

Portugal 0501-8-12-198

Spain 900-94-1460

Switzerland 155-9891

UK 0800-89-9047

Call Free International Toll Free

East Coast Sales & Corporate Office

5426 Beaumont Cir Blvd., #300, Tampa, FL 33634

800-545-TPCS

813-885-1123

813-884-7151 Fax

800-945-8324 Tech Support

Video and More...

NEC

31qz 15" Monitor	
5d 20" Multisync Monitor	
5lg 17" Monitor	
6lg 20" Monitor	
2A 14" Monitor	
Samsung	
12" Amber Monitor	\$82.00
14" White VGA Monitor	\$119.00
17" CSA 7571 Monitor	\$879.00
Panasonic	
138li SVGA 14" (interlaced)	\$369.00
1395 SVGA 14" (non-interlaced)	\$499.00
C1991 SVGA 20" (non-interlaced)	\$1799.00

Mitsubishi

HL 6605 16" Monitor	\$1019.00
HL 6945 20" Monitor	Call

Seiko

CM 1440-14" Interlaced	\$479.00
CM 1450-14" Non-Interlaced	\$599.00
CM 1760-17" Non-Interlaced	\$1249.00
CM 2050-20" Non-Interlaced	\$1899.00

also available is RasterOps & Radius!

Video Boards and More...

ATI

VGA 1024i 256k	\$129.00
VGA 1024i 512k	\$159.00
Video 7 VGA 16	\$92.00
VRAM II 512k	\$255.00
VRAM II 1 Mb	\$355.00

ATI

ATI Integra	Call
VGA Wonder XL w/mouse 256k	\$176.00

VGA Wonder XL

w/mouse 512k	\$199.00
--------------	----------

VGA Wonder XL

w/mouse 1 Mb	\$215.00
--------------	----------

8541 Ultra 512k

8541 Ultra 1 Mb	\$499.00
-----------------	----------

Vantage 512k

w/mouse	\$349.00
---------	----------

Vantage 1 Mb w/mouse

Graphics Ultra 1 Mb w/mouse	\$369.00
-----------------------------	----------

Laser Memory and More...

Hewlett Packard

2 Mb	
4 Mb	

AST 4450i and 4455

2 Mb	Call
4 Mb	Call

also available for QMS, Epson, Okidata, and more!

West Coast Sales & Canada Sales

4730 Walnut, #105, Boulder, Colorado 80301

800-846-TPCS

800-846-1727

303-447-3962 Fax

800-945-8324 Tech Support

Drives and More...

Quantum

52 Mb Quantum LPS	
80 Mb Maxtor	
105 Mb Quantum LPS	
120 Mb Maxtor	
120 Mb Quantum LPS	
213 Mb Maxtor	
240 Mb Quantum LPS	
Internal SCSI	
52 Mb Quantum LPS, 12ms	\$239.00
80 Mb Maxtor	\$299.00
105 Mb Quantum LPS, 12ms	\$349.00
120 Mb Maxtor, 15ms	\$359.00
120 Mb Quantum LPS, 11ms	\$439.00
213 Mb Maxtor, 15ms	\$589.00
240 Mb Quantum LPS, 11ms	\$739.00
340 Mb Maxtor, 13ms	\$989.00
357 Mb Fujitsu, FH, 16ms	Call
425 Mb Fujitsu, HH, 12ms	\$1189.00
520 Mb Fujitsu, HH, 9ms	\$1249.00
535 Mb Maxtor, 11ms	\$1449.00
672 Mb Fujitsu, FH, 16ms	Call
760 Mb Maxtor, 13ms	\$1499.00
1.08 Gb Fujitsu, FH, 14.5ms	Call
1.2 Gb Maxtor, 13ms	\$2169.00

External SCSI

52 Mb Quantum LPS, 12ms	\$299.00
80 Mb Maxtor	\$369.00
105 Mb Quantum LPS, 12ms	\$429.00
120 Mb Maxtor, 15ms	\$429.00
120 Mb Quantum LPS, 11ms	\$519.00
213 Mb Maxtor, 15ms	\$659.00
240 Mb Quantum LPS, 11ms	\$809.00
340 Mb Maxtor, 13ms	\$1079.00
357 Mb Fujitsu, FH, 16ms	Call
425 Mb Fujitsu, HH, 12ms	\$1249.00
520 Mb Fujitsu, HH, 12ms	\$1309.00
672 Mb Fujitsu, FH, 16ms	Call
760 Mb Maxtor, 13ms	\$1559.00
1.08 Mb Fujitsu, FH, 14.5ms	Call
1.2 Gb Maxtor, 13ms	\$2279.00

Removables and More...

Low price includes one cartridge.

External Hard Drive.

ETC Dual 45R/88R SyQuest**

Two removable drives in one box. Includes one of each cartridge!

ETC 88R SyQuest Removable**

New low price includes one cartridge.

MacUser's four mice winner!!

*Controller card optional *External Hard Drive

45 Mb Syquest Cartridge \$65.00

88 Mb Syquest Cartridge \$119.00

Welcome to PC's and MORE!

Where you get more than just a great price, you also get a knowledgeable sales staff. Our multi-lingual staff are ready to help the international buyer too!

No Surcharge for Visa or MasterCard



Memory and More...

Memory for IBM Compaq

1x9 SIMM 80ns	
4x9 SIMM 80ns	
256x9 SIMM 80ns	
512x36 2 Mb 80ns	
1x36 4 Mb 80ns	
Memory for Compaq	
1 Mb Add-On Modules	
4 Mb Add-On Modules	
Exp. Cards	
Upgrade Kits	
SIMMS	

...we carry memory for all major brands!

All it takes is one call to get the latest and greatest brand and price!

Modems and More...

Acorn

Pocket Edition	\$116.00
2400 External	\$299.00
2400B Internal	\$239.00
Ultra 9600 External	\$649.00
Practical Peripherals	
2400 V.42 Internal	\$169.00
2400 V.42BIS External	\$199.00
2400 Internal	\$84.00
2400 SA	\$179.00
2400 Pocket	\$109.00
9600 V.32	\$459.00
9600 V.32 Internal	\$389.00
Fax Modem 2400	Call
Fax Modem 9600	Call
US Robotics	
V.32 BIS 9600 Internal	Call
V.32 9600 External	Call

CD-ROMs and More...

IBM

1700 S External	\$549.00
Sony	
CDU-7201 External	
CDU-535 Internal	
CDU-54101 Internal SCSI	
SMO-S501 650 Mb M-O	

Toshiba

3301 External	
3301 Internal	
CDR 73 External	
CDR 83 Internal	
CDR 36 External Portable	
NEC	
CDR 36 External Portable	\$449.00
CDR 73 External	\$669.00
CDR 83 Internal	\$599.00

Terms and Conditions: Payment: PC's and MORE accepts Visa, MasterCard, CDEs, and Purchase Orders. CDEs are shipped Cash/Certified Check up to \$10,000. Corporate and School Purchase Orders are Net-15 for orders over \$2500 only, and are subject to credit approval. Warranties: All warranties on Apple brand products sold by PC's and MORE will be honored by PC's and MORE or its authorized agents only. PC's and MORE is not an authorized Apple reseller. All other manufacturers warranties are honored by PC's and MORE and the original manufacturer. Returns: All orders returned or refused will be charged a minimum 15% restocking fee. Call for an RTS before returning. Returns must be in original packing with software seals unbroken. Shipping: For orders over \$1000 we ship to destinations in the continental US at no charge. Some large items may not be included in this offer. Ask for details when ordering. Terms, Conditions, and Prices are subject to change without notice or obligation. All products sold by PC's and MORE are new. We do not sell used equipment. © 1992 PC's and MORE, Inc. All rights reserved. 522023

CIRCLE 016 ON READER SERVICE CARD

A huge new computer superstore just opened in your driveway.





PACKARD BELL
America grew up listening to us. It still does.

**20 MHZ 386SX
DESKTOP**

\$1295*

or \$51.15/mo. lease

- Intel 386SX processor
- 2MB RAM expandable to 4MB
- 84 MB Hard drive, 17 MS
- Both 3.5" & 5.25" HD floppy drives
- Super VGA controller, 800x600
- 2400 baud modem
- Mouse
- Parallel, mouse, 2 serial ports
- Microsoft DOS 5.0, Windows, Works
- 1 year on-site parts & labor warranty

14" Color VGA monitor add \$200

**25 MHZ 386SX
NOTEBOOK**

\$2099*

NEW

or \$59.82/mo. lease

- Intel 386SX processor
- 2MB RAM expandable to 8MB
- 32KB cache RAM
- 60 MB Hard drive, 23 MS
- 3.5" 1.44MB HD floppy drive
- 9" triple twist CCFL sidelit reversible LCD screen
- Super VGA controller, 800x600
- 2.5HR battery, recharger
- Key Mouse
- Parallel, serial, monitor, external keyboard ports
- Weight 6.9LBS with battery
- Microsoft DOS 5.0, Windows, Works
- 1 year carry-in parts & labor warranty

80MB disk drive configuration
\$2299

**25 MHZ 386SL
COLOR NOTEBOOK**

\$2999*

NEW

or \$85.47/mo. lease

- Intel 386SL processor
- 2MB RAM expandable to 10MB
- 60 MB Hard drive, 23 MS
- 3.5" 1.44MB HD floppy drive
- 9" passive matrix color LCD, 256 colors
- Super VGA controller, 800x600
- 2.5HR battery, recharger
- Key Mouse
- Parallel, serial, monitor, external keyboard ports
- Weight 6.9LBS with battery
- Microsoft DOS 5.0, Windows, Works
- 1 year carry-in parts & labor warranty

80MB disk drive configuration
\$3199

**16 MHZ 386SX
DESKTOP**

\$949*

- Intel 386SX processor
- 2MB RAM expandable to 5MB
- 107 MB Hard drive, 20MS
- Both 3.5" & 5.25" HD floppy drives
- Super VGA controller, 800x600
- Mouse
- Parallel, serial, game, mouse ports
- Microsoft DOS 5.0, Lotus Works & templates
- 1 year return-to-depot parts & labor warranty

14" Color VGA monitor add \$249

**20 MHZ 486SX
DESKTOP**

\$1799*

or \$51.27/mo. lease

- Intel 486SX processor
- 4MB RAM expandable to 32MB
- 8KB cache expandable to 128KB
- 105 MB Hard drive, 20MS
- Both 3.5" & 5.25" HD floppy drives
- Extended VGA controller, 1024x768, 512KB
- 2400 baud modem
- Mouse
- Parallel, mouse, serial ports
- Microsoft DOS 5.0, Windows, Lotus 123 for PB, PRODIGY, Lotus Write, SmartPics
- 1 year on-site parts & labor warranty

14" Color extended VGA monitor add \$269

With an astonishing choice that we can deliver

Now there's an incredibly convenient way to buy fully configured brand name PCs. At the guaranteed lowest price, delivered direct to your door.

We're not kidding. At PCs Compleat we guaran-

tee to meet or beat any advertised price for the same PC for 30 days after the sale.

But that's just the start.

When you buy from us we'll configure your computer with all the bells and whistles you want.

Whether you need an expanded memory, a network card, a larger disk drive or a host of other peripherals. We'll even load your PC with your choice of software, for a nominal charge.

Best of all, our computers come with the confidence you only get with brand name PCs. The names you trust, backed with serious toll-free technical support for

WHO EXACTLY ARE YOU BUYING FROM?



PCs Compleat was founded by Bill Brown, Gordon Hoffstein and Jack Littman-Quinn, well-known computer industry executives who previously created one of the world's largest distributors of micro-computers, peripherals, software and local area networks.

THE OUTSTANDING ADVANTAGES OF PCs COMPLEAT

- Choice of Brand Name Computers
- Lowest Price Guarantee
- Custom Configuration
- Lifetime Free Technical Support
- Immediate Delivery Pledge
- Personalized, Hassle-Free Ordering
- Free On-Site Warranty Service
- Toll-Free Sales and Technical Support
- One-Stop Shopping
- Major Credit-Cards, Open Accounts and Leasing Programs

* PRICE MAY BE LOWER WHEN YOU CALL.

© 1992 PCs COMPLEAT. ALL PRICES ARE SUBJECT TO CHANGE, AND DO NOT INCLUDE SHIPPING. LEADING EDGE IS A TRADEMARK OF DAEWOO TELECOM CORPORATION. PACKARD BELL IS A TRADEMARK OF PACKARD BELL ELECTRONICS, INC. AND IS NOT AFFILIATED WITH ANY FORMER BELL SYSTEM ENTITY. EVEREX IS A TRADEMARK OF EVEREX SYSTEMS, INC. WIN SX IS A TRADEMARK OF TEXAS INSTRUMENTS INC. TOSHIBA IS A TRADEMARK OF THE TOSHIBA AMERICA INFORMATION SYSTEMS, INC. GEOWORKS IS A TRADEMARK OF GEOWORKS, INC. MICROSOFT AND MS-DOS ARE REGISTERED TRADEMARKS AND WINDOWS IS A TRADEMARK OF MICROSOFT CORPORATION. LOTUS WRITE, LOTUS 1-2-3, LOTUS WORKS, LOTUS SMARTPICS ARE TRADEMARKS OF LOTUS DEVELOPMENT CORPORATION. PRODIGY IS A TRADEMARK OF PRODIGY SERVICES, INC. ALL OTHER PRODUCTS OR BRAND NAMES ARE TRADEMARKS OF THEIR RESPECTIVE COMPANIES.

EVEREX
1.44 MB Expansion

**TEXAS
INSTRUMENTS**

TOSHIBA

**20 MHZ 386SX
DESKTOP**

\$1195*

or \$34.06/mo. lease

- New slimline, compact chassis
- Intel 386SX processor
- 2MB RAM expandable to 8MB
- IDE controller
- 3.5" 1.44MB HD floppy drive
- Super VGA controller, 800x600
- Mouse
- Parallel, 2 serial ports
- Microsoft DOS 5.0 & Windows
- 1 year parts & labor warranty, 90 days on-site

Super VGA monitors start at \$150

**20 MHZ 386SX
NOTEBOOK**

\$1999*

or \$56.97/mo. lease

- Intel 386SX processor
- 1MB RAM expandable to 5MB
- 40 MB Hard drive, 25MS
- 3.5" 1.44MB HD floppy drive
- 9.75" VGA backlit LCD screen
- VGA controller
- 3HR battery, quick recharger
- Mouse and padded carrying case
- Parallel, serial, VGA monitor port
- Weight 6.9LBS with battery
- Microsoft DOS 5.0, Windows
- 1 year parts & labor warranty, free overnight pick-up/delivery
- 3MB RAM/40MB hard drive configuration \$2199
- 5MB RAM/60MB hard drive configuration \$2549

**20 MHZ 386 WINSX
NOTEBOOK**

\$2599*

or \$74.07/mo. lease

- Intel 386SX processor
- 4MB RAM expandable to 6MB
- 60 MB Hard drive, 19MS
- 3.5" 1.44MB HD floppy drive
- 10" triple supertwist sidelit LCD screen
- SVGA controller, 1024x768
- Battery, AC adapter, recharger
- TravelPoint trackball
- Parallel, serial, monitor, keypad, mouse, bus ports
- Weight 5.7LBS with battery
- Microsoft DOS 5.0, Windows
- 1 year carry-in parts & labor warranty
- 80MB disk drive configuration \$2999
- 120MB disk drive configuration \$3349

**25 MHZ 386SL
NOTEBOOK**

**CALL
FOR PRICE**

NEW

- Intel 386SL processor
- 2MB RAM expandable to 8MB
- 64KB cache RAM
- 40 MB Hard drive
- 3.5" 1.44MB HD floppy drive
- 9.5" fluorescent sidelit LCD screen, 32 gray scale
- VGA controller
- 3+HR battery, AC adapter, recharger
- Parallel, serial, monitor, keyboard, mouse, bus ports
- Weight 5.9LBS with battery
- Microsoft DOS 5.0
- 1 year carry-in parts & labor warranty

**25 MHZ 486SX
NOTEBOOK**

**CALL
FOR PRICE**

NEW

- Intel 486SX processor, upgradeable to 486DX25
- 8MB cache RAM
- 2MB RAM expandable to 10MB
- 80 MB Hard drive, 19MS
- 3.5" 1.44MB HD floppy drive
- 9.5" gas plasma or page white LCD display
- VGA controller
- 3.5HR battery, AC adapter, recharger
- Parallel, serial, monitor, keyboard, mouse, bus ports
- Weight 7.25LBS with battery
- Microsoft DOS 5.0
- 1 year carry-in parts & labor warranty

ice of brand name PCs right to your door.

THE COMPUTER YOU WANT CONFIGURED
TO YOUR EXACT SPECIFICATIONS.



We can configure your system with the leading brands in every category of peripheral and accessory. Disk Drives: Quantum and Conner; Tape Backup: Mountain, Maynard, Archive and Irwin; Math Coprocessors: Intel and Cyrix; Monitors: NEC and Amdek; Modems: Intel and Zoom; LAN Adapters: Standard Micro Systems and Intel; Memory: ZRAM; Printers: Okidata; Software: A huge assortment.

as long as you own your machine.

And with us, ordering is hassle-free and delivery is immediate. We'll ship your standard configuration system within 24 hours (usually the same day) and your custom configured system within 48 hours.

There's no one in the country that can offer you the extraordinary value you get buying from PCs Compleat. From pricing to configuration, to service, to delivery, to brand names, no one

1-800-669-4727

FAX: 1-800-669-8329
9 A.M. - 9 P.M. (EST) MONDAY-FRIDAY

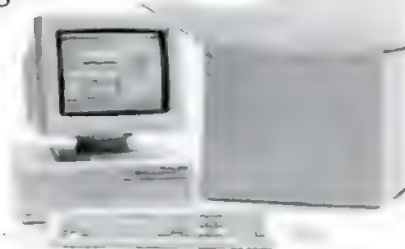
comes close. It's a totally new era in PC buying that we call *Plug and Play Direct*.

To find out the whole story on our entire line of PCs, printers, software and peripherals, just give us a call.

And keep a sharp eye

out for delivery trucks. Your new, fully configured brand name PC could arrive in your driveway tomorrow.

MORE COMPUTER
OPTIONS THAN YOU'D
EVER IMAGINE.



This ad is just a sample. We carry the compleat lines of all the computers you see here.

PCs COMPLEAT

Real Service ♦ Unreal Prices

PCs COMPLEAT, INC. • 495 TECHNOLOGY CENTER WEST
34 ST. MARTIN DRIVE • MARLBOROUGH, MA 01752 • (508) 480-8500

CIRCLE 092 ON READER SERVICE CARD

COPY SOFTWARE ILLEGALLY AND YOU COULD GET THIS HARDWARE ABSOLUTELY FREE.



Software piracy isn't just a crime. It's a shame. Because most people who do it aren't even aware that it's illegal. If you copy software that's protected by copyright, you could lose your job, face a civil suit, pay a \$100,000

fine and possibly be imprisoned. So get the facts now. To request more information, contact the Software Publishers Association at 1-800-388-7478. Because in a court of law, ignorance is one thing you won't be able to plead.

Please send me more information on the legal use of software.

Name _____

Organization _____

Title _____

Address _____

City _____ State _____ Zip _____

Please check software format you prefer if you would like to receive SPAdm:
a software inventory management tool

☐ DOS 3.3 ☐ DOS 5.0 ☐ Macintosh®

Mail to: Piracy Update, 1730 M Street, N.W.
Suite 700, Washington, D.C. 20036-4510

D-1

SPA Don't Copy That Floppy

BUY
HDI



PC
MAGAZINE
EDITORS'
CHOICE

June 27, 1989
Mass Storage Max Order

A RECOGNIZED LEADER!

HARD DRIVES AND PERIPHERALS

NEW
LOWER
PRICES

Worry-Free
30
Day
GUARANTEE

FOR THE BEST
PRICE, SERVICE
& SUPPORT
CALL:

800 / 998-8041

HDI SALES: 602/350-1128
FAX 602/350-1150

NATIONAL ACCOUNTS
Purchase Orders
800/927-2907
FAX 602/350-1180

International: 602, 350-1144
FAX 602/350 1188

APO/FPO: 602/350-1145

Order Status: 800/729-4490

Quantum

52MB QULPS52A (IDE)
17ms 3.5" 1"H
Bare Drive Kit \$209
16 Bit Kit \$229

105MB QULPS105A (IDE)
17ms 3.5" 1"H
Bare Drive Kit \$349
16 Bit Kit \$369

210MB QUPRO210A (IDE)
15ms 3.5" HH
Bare Drive Kit \$649
16 Bit Kit \$669

Seagate

IMPRIMIS

42MB ST351A (IDE)
28ms 3.5" 1"H
Bare Drive Kit \$179
8 Bit Kit \$209
16 Bit Kit \$199

60MB ST277R-1 (RLL)
28ms 5.25" HH
Bare Drive Kit \$249
8 Bit Kit \$299
16 Bit Kit \$319

106MB ST3120A (IDE)
18ms 3.5" 1"H
Bare Drive Kit \$319
8 Bit Kit \$349
16 Bit Kit \$379

130MB ST3144A (IDE)
16ms 3.5" 1"H
Bare Drive Kit \$359
16 Bit Kit \$379

210MB ST1239A (IDE)
15ms 3.5" HH
Bare Drive Kit \$599
16 Bit Kit \$619

1050MB ST41200N (SCSI)
15ms 5.25" FH
Bare Drive Kit \$2099
16 Bit Kit \$2249



Talon

105MB SA3101A (IDE)
16ms 3.5" 1"H
Bare Drive Kit \$329
8 Bit Kit \$349
16 Bit Kit \$389

120MB SA3062A (IDE)
16ms 3.5" 1"H
Bare Drive Kit \$379
8 Bit Kit \$399
16 Bit Kit \$399

FUJITSU

513MB M2624T (IDE)
12ms 3.5" HH
Bare Drive Kit \$1199
16 Bit Kit \$1295

1079MB M2266SA (SCSI)
14.5ms 5.25" FH
Bare Drive Kit \$2099
16 Bit Kit \$2299

CONNER

40MB CP3000 (IDE)
25ms 3.5" 1"H
Bare Drive Kit \$189
8 Bit Kit \$219
16 Bit Kit \$199

120MB CP30104 (IDE)
16ms 3.5" 1"H
Bare Drive Kit \$379
8 Bit Kit \$419
16 Bit Kit \$399

205MB CP3204 (IDE)
16ms 3.5" HH
Bare Drive Kit \$609
16 Bit Kit \$629

MICROPOLIS

340MB MC1664 (ESDI)
15ms 5.25" HH
Bare Drive Kit \$1099
16 Bit Kit \$1199

560MB MC1568/1588 (ESDI SCSI)
16ms 5.25" FH
Bare Drive Kit \$1499
16 Bit Kit \$1699

1034MB HS MC1598 (SCSI)
14ms 5.25" FH
Bare Drive Kit \$2199
16 Bit Kit \$2299

1354MB HS MC1528 (SCSI)
14ms 5.25" FH
Bare Drive Kit \$2699
16 Bit Kit \$2799

Maxtor

120MB MX7120A (IDE)
15ms 3.5" 1"H
Bare Drive Kit \$389
8 Bit Kit \$429
16 Bit Kit \$399

210MB MX213A (IDE)
15ms 3.5" HH
Bare Drive Kit \$599
8 Bit Kit \$629
16 Bit Kit \$629

SIMM

ADD 1MB RAM
AS LOW AS \$39

1MB x9 80ns \$49
1MB x8 80ns \$39
Add \$2 for SIP
MEMORY FOR EVERY SYSTEM!

CD ROM DRIVES

600MB	Internal	External
TALON	\$299	N/A
SONY	\$389	\$509
CHINON	\$399	\$519
TOSHIBA	\$599	\$699

ALL BARE DRIVE KITS INCLUDE:
All mounting hardware, "Disk Manager"
formatting/partitioning software if
necessary, and HDI's Hard Drive
Reference Manual with complete
installation instructions.

COMPLETE INSTRUCTIONS - EVERYTHING YOU NEED!

ALL 8 & 16 BIT KITS INCLUDE:
16-bit hard adapter hard/floppy "1 to 1"
controller or interface card, mounting kit
(3.5" kit inc. beige & black bezels), rails,
cables, all mounting hardware, "Disk Man-
ager" software (if applicable) and manuals.

NEW! NEW! NEW!
ALWAYS LOW PRICES
SOFTWARE!
SUPER LOW WITH PURCHASE
OF HARDWARE
Call for details

Insight
COMPUTERS
Printers & Software, too!
LOOK FOR OUR ADS
IN THIS ISSUE

HARD DRIVES International
800/998-8041

PURCHASE ORDERS/NATIONAL ACCOUNTS 800/927-2907

HARD DRIVES
International

HKI

In the past 15 years, USA FLEX has grown into one of the largest manufacturers and distributors of personal computers and peripherals. Our mission has been, and always will be, to provide our customers with quality products, price them competitively, and back them up with outstanding service and support.



Teamwork is the reason USA Flex has grown to be one of the largest manufacturers/distributors of personal computers and peripherals, and it starts with owners Phil (left) and Chuck (right).

The Flex Advantages

- ✓ 15 Years of the Service and Support You Expect**
 Since the beginning in 1977 and for the past 15 years, USA FLEX has remained steadfast in its COMMITMENT TO SUPERIOR QUALITY, COMPETITIVE PRICES AND OUTSTANDING SERVICE. It always has been and always will be the cornerstone of USA Flex philosophy.
- ✓ 30 Day "No-Risk" Money Back Guarantee**
 Try any Flex system in your home or office. Put it through its paces. If it doesn't perform to your complete satisfaction, you may simply return it within thirty days of the date of purchase for a full credit, refund or replacement. No questions... no hassles.
- ✓ Toll Free Technical Support**
 With the purchase of any Flex system, you are entitled to unlimited toll-free support. And this support is there for you not just for the first thirty days, but for as long as you own your system.
- ✓ Free On-Site Service for 1st Year**
 If for any reason, one of our technicians cannot solve your problem over the phone, we will gladly make arrangements to have a qualified, trained field technician come to your place of business. And in case you're worried about frustrating and costly downtime, don't be. In most cases, our technicians will be there within 24 hours from the time you call.
- ✓ Friendly, Knowledgeable Sales Staff**
 The Flex sales staff is diligently trained in every system, peripherals, and software package we sell. They are a team of professionals who are dedicated to helping you find the right solution to all your computing needs. Their goal is not some sales quota but YOUR TOTAL SATISFACTION. It doesn't matter whether this is your first computer or your 101st, our sales consultant is there to help you configure a system that fits your needs and budget.
- ✓ Full One Year Warranty... Parts and Labor Included**
 When you buy from Flex, you are buying not only a great system but also peace of mind in knowing that should there be a problem, you are covered—from motherboard to monitor—with the exclusive Flex warranty.
- ✓ Quick Delivery**
 Housed in our new, ultra-modern 76,000 square foot warehouse is over \$10,000,000 in inventory. What this means to you is that your system is shipped complete... no long lead times, no back orders. Just what you ordered, when you wanted it.
- ✓ Quality Products**
 At Flex, we buy from the leading names in the business—names like Seagate, Intel, AMD, Quantum, and NEC. No skimping on quality. If the Flex name is going on it, we want to make sure it is the best it can possibly be. It is probably for this reason that Flex has won 14 "Best Buy" awards from the readers of Computer Shopper magazine—people like you who have used our products and chosen them as the best.
- ✓ Over 200,000 Satisfied Customers**
 Each and every one of the 170 employees at Flex is dedicated to only one thing—our customer. Whether you are a home user, a student, a small business person, or a corporate executive, we value your business and want to make sure you are satisfied with your Flex system. Our past growth is a result of this dedication; our future growth depends on it.
- ✓ Wide Variety of Payment Options**
 Once you decide what Flex system you want. Charge it on your FLEXCARD, VISA or MASTERCARD. Whatever option you choose, just let your Flex representative know and they will take care of all the details.

The Flex System Solutions

386SX 16 & 20MHz

- 80386SX 16MHz Microprocessor
- 105 MB < 16ms Hard Disk Drive
- 2 MB RAM
- Super VGA 1024 X 768 "FLEXVISION" 14" .28 mm Interlaced Monitor
- Super VGA Card with 1 MB Memory
- 1.2 MB and 1.44 MB Floppy Disk Drives
- 101 "FLEXKEY" Keyboard
- 2 Serial and 1 Parallel Port
- FLEX Slimline Cabinet

\$1349

Lease from
\$60 /Month*

386SX 20MHz \$1399
386DX 25MHz \$1599

386DX 33 & 40MHz Cache

- 80386 33MHz Microprocessor
- 64K Ultra-fast "Writeback" Cache Mem.
- 105 MB < 16ms Hard Disk Drive
- 4 MB RAM
- Super VGA 1024 X 768 "FLEXVISION" 14" .28 mm Non-Interlaced Monitor
- Super VGA Card with 1 MB Memory
- 1.2 MB and 1.44 MB Floppy Disk Drives
- 101 "FLEXKEY" Keyboard
- 2 Serial and 1 Parallel Port
- Up to 32 Meg on Motherboard
- Power meter MIPS - 10 with 40 MHz
- Tested for: Unix, Zenix, Novell
- FLEX Desktop Cabinet

\$1749

Lease from
\$65 /Month*

386DX 40MHz \$1799

486 33MHz 128K Cache

- 80486 33MHz Microprocessor
- 128K Ultra-fast "Writeback" Cache Mem.
- 210 MB 15ms Hard Disk Drive
- 4 MB RAM
- Super VGA 1024 X 768 "FLEXVISION" 14" .28 mm Non-Interlaced Monitor
- Super VGA Card with 1 MB Memory
- 1.2 MB and 1.44 MB Floppy Disk Drives
- 101 "FLEXKEY" Keyboard
- 2 Serial and 1 Parallel Port
- Up to 32 Meg on Motherboard
- Power Meter MIPS - 15
- Tested for: Unix, Zenix, Novell
- FLEX Mid-Tower Cabinet

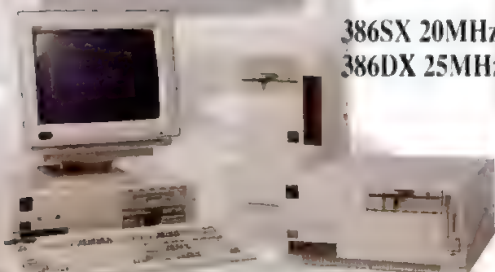
\$2499

Lease from
\$93 /Month*

*Monthly payment based on
36 month open end lease.

INCLUDED WITH EVERY FLEX SYSTEM

- FREE WINDOWS 3.0 AND MOUSE • FREE DOS 5.0 •
- FREE PFS WINDOWWORKS SOFTWARE (WORD PROCESSOR, SPREADSHEET, DATA BASE) •
- FREE PC TEST DIAGNOSTIC SOFTWARE FOR QUICK SERVICE •
- 30 DAY "NO RISK" MONEY BACK GUARANTEE •
- TOLL FREE TECHNICAL SUPPORT—24 HOURS, 7 DAYS A WEEK •
- FREE ON-SITE SERVICE • ONE YEAR PARTS AND LABOR WARRANTY •



The FlexNote 386SXL 25 MHz Notebook

Here's what PC Magazine said...

"...few systems can beat this value."

PC Magazine
January, 1992
Product Review



January 28, 1992
USA FlexNote 20



Here's why they said it...

With the FlexNote 386SXL 25 MHz you get **TOTAL VALUE...**
a notebook computer offering superior quality and performance, plus features and extras you'd thought you'd never find for this low price.

FlexNote 386SXL 25 MHz

The FlexNote features:

- 80 MB, 19ms Hard Drive
- 2 MB RAM (expandable to 9 MB)
- 3.5", 1.44 MB Floppy Drive
- 1 Parallel, 1 Serial & 1 Mouse Port
- Super Fast VGA Graphics
- Full Size 85 Key Keyboard

FREE Microsoft® DOS® 5.0

FREE Microsoft Windows 3.0

FREE Pen Mouse

— The Perfect companion for your FlexNote.

FREE PFS: WindowWorks™

— It's everything you need in one integrated package.

FREE PC Test™ Diagnostics Software

FREE Carrying Case

Now Includes:

- 80MB hard drive
- SXL low power chipset for longer battery life



The Flex Portable Solution

This package features...

1. The FlexNote 386SXL 25MHz (see above for specs)

PLUS...

2. A 2400 Baud Internal Modem with 9600 Send/Receive Fax.

PLUS...

3. The PN48 Notebook Citizen Printer

The world's smallest laser-quality printer designed especially for Laptops!

Weights only 2.5 lbs. with the battery pack

Fits in your briefcase neatly next to your laptop PC, because it's incredibly small

Able to print on a variety of media, anything from letterhead to transparencies

Rechargeable NiCAD battery pack provides up to 25 laser-quality pages without recharging

FOR ONLY...

\$2499



USA FLEX

1-800-800-4395

Government and Education 1-800-767-0153

Please refer to code # PM05A2 when placing an order.

471 Brighton Drive, Bloomington, IL 60108



All prices and specifications are subject to change without notice. All products or services are identified by the trademarks or service marks of their respective companies.

CIRCLE 189 ON READER SERVICE CARD

2.6 Gb
Compression SCSI DAT
\$1899



APS Compression DAT is based on Archive Python 3.5-inch DAT mechanism and features:

Digital Data Storage Compression that expands storage capacity and increases transfer rates.

Higher capacity—2.6 gigabytes on the 60-meter DAT cassette.*
Compatible w/both 60- and 90-meter cassettes.

High speed random access to any file on the tape.

Uncorrectable error rate of less than 1 in 10^{15} bits.

Four Direct-Drive motors (4DD) eliminate belts and mechanical mode changes.

*Included with unit.

• **Toll-Free Technical Support** •

Toll-Free Technical Support, 9am to 7pm Monday thru Friday Central Time. As often or for as long as you need.

• **30-Day Money-Back Guarantee** •

All products carry a 30-day money-back guarantee. Your risk in the transaction is the cost of shipping.

• **Disk-for-Disk Replacement Warranty** •

Quantam, Maxtor, Syquest and Archive drives carry a two-year "parts & labor" disk-for-disk replacement warranty. WREN, Teac, WangDAT, Corner Micromax products and Syquest Cartridges carry a one-year "parts & labor" disk-for-disk (board for board) replacement warranty.

• **Mounting Hardware & Cables Included** •

All Hard Drives include rails, extenders and data cables required for standard operation. Board products are populated but without RAM.

• Prices & Specifications Subject to Change Without Notice •

1-800 235-8935

M-F 7AM-9PM CST SAT 10AM-4PM CST

INTERNATIONAL: 1-816 478-8300

FAX: 1-816 478-4596

TOLL FREE: 1-800 235-8935

TELEPHONE: 1-816 478-8300

1-816 478-4596

© 1994 EAL, INC. ALL RIGHTS RESERVED



Turn your excess inventory into a substantial tax break and help send needy kids to college as well.

Call for your free guide to learn how donating your slow moving inventory can mean a generous tax write off for your company.

Call (708) 690-0010

Peter Roskam

Executive Director

EAL

P.O. Box 3021, Glen Ellyn, IL 60138

FAX (708) 690-0565

Excess inventory today...student opportunity tomorrow

Seagate Seagate Seagate

All Drives Include:
Universal Installation Manual,
AT Rails & Cable

3.5" HALF HEIGHT DRIVES

ST-157N-1 SCSI	48 6MB	28MS	\$215
ST-157R-1 RLL	49 1MB	28MS	\$225

5.25" HALF HEIGHT DRIVES

ST-225 MFM	21 4MB	65MS	\$179
ST-251-1 MFM	42 8MB	28MS	\$239
ST-277R-1 RLL	65 5MB	28MS	\$249
ST-296N SCSI	84 9MB	28MS	\$269

SWIFT FAMILY 3.5" HALF HEIGHT

ST-1239A IDE	211MB	15MS	\$569
--------------	-------	------	-------

3.5" LOW PROFILE DRIVES

ST-351A IDE	42MB	28MS	CALL
ST-3120A IDE	106 9MB	16MS	CALL
ST-3144A IDE	130 7MB	19MS	CALL

FREE SHIPPING

on All Wren Family Drives:

WREN FAMILY 5.25" FULL HEIGHT

ST-4766E ESDI	676MB	15 5MS	\$1,349
ST-4766N SCSI	676MB	15 5MS	\$1,419
ST-41200N SCSI	1050MB	16 5MS	\$1,849
ST-41200NV NOV	1050MB	16 5	\$1,849
ST-41650N SCSI	1420MB	17 5MS	\$2,319

CONTROLLERS

ST-01 SCSI 8 Bit Adaptor	\$29
ST-02 SCSI 8 Bit Adaptor w/FD Control	\$45
ST-07 IDE Controller Hard Drive Only	\$29
ST-08 IDE Controller - HD & Floppy	\$39
ST-11M MFM 8 Bit Controller	\$51
ST-11R RLL 8 Bit Controller	\$51
ST-21M MFM 16 Bit Controller	\$39
ST-21R RLL 16 Bit Controller	\$39
ST-22M MFM 16 Bit Hard Drive & Floppy	\$67
ST-22R RLL 16 Bit Hard Drive & Floppy	\$65

QUANTUM

IDE 52 / 80 / 105 MG LPS	\$195/\$295/\$309
IDE 120 / 240 MG LPS	\$345/\$619
SCSI 52 / 105 MG LPS	\$205/\$335
SCSI 120 / 240 MG LPS	\$409/\$655
SCSI 425 ProDrive	FREE DELIVERY \$1,399
210 Pro Drive IDE/SCSI	\$639/\$659

MAXTOR

7060 SCSI	\$239
7080 IDE / SCSI	\$269 / \$289
7120 IDE / SCSI	\$349 / \$349
LXT 213 IDE / SCSI	\$549 / \$579
LXT 340 IDE / SCSI	\$919 / \$919

Colorado Memory

DJ10-120MB	\$199
ADAPTORS:	
AB11 External	\$37
KE10 External	\$109
DJ20 - 250MB	\$249
ADAPTORS:	
FC10 Internal	\$79
KE10 External	\$109
QFA-700 Internal	\$709
QFA-700 External	\$939
ADAPTOR:	TC02 Internal \$239

SYQUEST

Removable Media Drives

SQ 555 44MB Bare Drive	\$309
SQ 5110 88MB Bare Drive	\$425
44/88MB Media Cartridge	\$79/\$125

SYDOS Removable Cart. Drive Kits

A Division Of Syquest Tech.

441 Internal Kit	\$439
44E External Kit	\$579
44/2 Dual	Call
88EL External Kit w/8 bit Adaptor	\$669
88IL Internal Kit w/8 bit Adaptor	\$589
88E External Kit w/16 bit Adaptor	\$839
88I Internal Kit w/16 bit Adaptor	\$799
88/2 Dual External Kit w/16 bit Adaptor	Call
Kits include: drive, host adaptor, media cartridge (2 w/dual), installation software, cables, manuals & Super PC Quick	
Sydos Cartridge Packages come with 2 year warranty on drive, 5 year warranty on media	

Canon All Media Floppy

The All-In-One 3.5" & 5.25" Half Height Int. Floppy Drive \$149

Plus Development

Hardcard II XL 50 / 105	\$295 / \$435
Passport XL 50 / 105 MB	\$339 / \$469
Passport XL 120 / 240 MB	\$679 / \$819

CHINON

FLOPPY DRIVES

5.25" 1 22MB PC/AT	\$59
3.5" with Frame 1 44MB PC/AT	\$59

IRWIN Tape Back-up

Accutrack 120/250 Standard Int.	\$185/\$239
Accutrack 120 Plus Int./Ext.	\$239/\$315
Accutrack 250 Plus Int./Ext.	\$299/\$379
Adaptor Board 4251 for Plus Ext.	\$75
Accelerator Board 4100 for Plus Series	\$119

LANTASTIC

AE/1T Ethernet Adaptor	\$135
AE/2T Ethernet Adaptor	\$195
AE-3 ISA Starter Kit/Adaptor	\$515/\$229
AE-2 Ethernet Starter Kit/Adaptor	\$449/\$195
2 Mbps Starter Kit/Adaptor	\$319/\$129
Z Two Station Kit	\$87
10 Base/T Starter Kit	\$579
Peer Hub 10 Base/T Connector	\$259
Peer Hub AUI Interface Kit	\$259
Lantastic Hub	\$319
Hub Installation Kit	\$115
Artiscribe Digital Dictation Starter Kit	\$449
Artisoft Central Station	\$385
Lantastic Voice Adaptor	\$75
Network Eye	\$115
Lantastic for Windows/Network	\$165/\$265
AE-2 Ethernet Software	\$75
Arbcom	\$219
AI V 4.1	\$59
AI Unlimited (up to 300 users) V4.1	\$1,349
AI Expansion 5-300 users)	\$1,079

PRINTERS

Panasonic
Office Automation

KX-P 1180i	\$155
KX-P 1123	\$195
KX-P 2180 / with Color Kit	\$175/\$219
KX-P 1124i	\$279
KX-P 1624	\$337
KX-P 2624	\$359
KX-P 1654	\$535
KX-P 4410	\$545
KX-P 2123 / with Color Kit	\$245/\$289
KX-P 2124 / with Color Kit	Call

CITIZEN

200 GX / with Color Kit	\$155/\$199
200 GX 15 / with Color Kit	\$295/\$359
GSX 130 / with Color Kit	\$239/\$279
GSX 140 PLUS	\$289
GSX 140 PLUS with Color Kit	\$335
GSX 145 Wide -24pin	\$365
GSX 145 with Color Kit	\$425
PN48 Notebook	\$299
PN 48 Professional Kit	\$329

star
TELEPHONES

NX-1001 Multifont	\$135
NX-1020 Rainbow	\$179
NX-2420 Rainbow	\$285
NX-2430 Black	\$235
Star Jet 48	\$285

SOUND BOARDS

Sound Blaster	\$109
Sound Blaster Professional	\$185
Sound Master II with Speaker	\$149
Ad Lib Music Card	\$65
AdLib Gold 1000/2000	\$179/\$245
Pro Audio Spectrum	\$185
Pro Audio Spectrum + 16	\$225
Thunderboard for Windows	\$119
Audio Port	\$139

Math Coprocessors

Only \$5 Shipping

IIT	LOWER PRICES!
2C87 - 8/10/12	\$65 / \$75 / \$77
3C87 - 16/20/25 each	\$147
3C87 - 33	\$159
3C87 - 40	\$193
3C87SX - 16/20/25	\$99 / \$112 / \$123

CYRIX

82587	\$82
82587S X-16/20/25	\$105 / \$119 / \$132
83D87 - 16/20/25 each	\$162
83D87 - 33	\$169
83D87 - 40	\$209

INTEL

287X NEW	\$85
80387 SX-16	\$125
80378 SX-20	\$135
80387-16/20/25/33 each	\$199

MONITORS

Panasonic
Office Automation

Panasonic C1381i, 28DP, 1024 x 768 **\$309**

Panasonic C1395, Non-Interlaced 28DP, 1024 x 768 \$429

PACKARD BELL

8539V, 39DP 640 x 480	\$219
8511, 28DP 1024 x 768	\$309
8548 SVGL, Non-Interlaced 28 1024 x 768	\$355

SONY

1304 Non-Inter, 25DP 1024x768	\$589
1604S Non-Inter., 25DP 1024x768	\$1,049

MODEMS

Cardinal 2400 Int./Ext.	\$59/95
Cardinal 9600 Internal V 32 w/ MNPS	\$285
Cardinal 9600 External V 42 w/ MNPS	\$335
Zoom 2400 Internal/External each	\$65
Zoom 2400 96 Send/Rec Int/Ext.	\$72/\$84
Zoom 2400 Int. Send/Rec Fax 9600	\$109
Zoom 2400 Ext. Send/Rec Fax 9600	\$119
Zoom 2400 S/R 9600 for Win Int.	\$129
Zoom 2400 S/R 9600 for Win Ext.	\$139
Zoom 2400 V 42 8IS External w/MNPS	\$129
Zoom 2400 V 42 w/ Send/Rec 9600 Int.	\$145
Zoom V 32 bis Internal/External	\$245/\$265
Zoom V 32 bis Send/Receive 9600 Int.	\$265
Zoom V 32 bis Send/Receive 9600 Ext.	\$319
Supra 2400 Internal w/ Mirror II	\$55
Supra 2400 External	\$79
Supra 2400 Plus Int. w/ MNPS V 42 BIS	\$109
Supra 2400 Plus Ext. w/MNPS V 42 BIS	\$129
Supra Fax Modem Plus 2400 Internal	\$129/145
Supra Fax Modem Plus 2400 External	\$149/165
Supra Fax Modem V.32, Ext. alone	\$239
Supra Fax Modem V.32, Int. alone	\$259 / \$279
SupraFaxModem V.32 bis, Ext. alone	\$309
Supra Fax Software, DOS/Win	\$329 / \$329

VIDEO BOARDS

UNITED SOLUTIONS:	
Image 800 8/16 bit 256 K	\$49
Image 1024 256K / 512K	\$89/\$79
Image Ultra 1 MB 1024 256 colors	\$135
Image Hi Color 1MB 1280x1024	\$145

LOGITECH

MICE	
Dexxa Serial / First Mouse Serial	\$29/\$42
KIDZ Mouse	\$42
Mouseman Serial 4000PI	\$67
Mouseman with Windows Serial	\$105
Mouseman with Windows Bus	\$135
Trackman Serial	\$59
Trackman Portable	\$95
Mouseman Cordless	\$85
SCANNERS	
Scanman Model 32 (gray scale)	\$139
Scanman Model 256 (gray scale)	\$255
Scanman 32 w/Catchword	\$175
Scanman Model 256 with	
Perceive Personal OCR Software	\$202
FotoMan	\$489

One of Wisconsin's Top 10 Women Owned Businesses.

Corporate, Government & School POs Welcome.

No Surcharge on Credit Cards.

Most Orders Shipped within 48 Hours.

Software Shipping only \$5 per order, net per title. Hardware: 5% - Minimum \$5.

C.O.D. orders Welcome, with a \$5.00 Charge.

We Ship Latest Version of Software Available.

All Products Sold Carry Manufacturers' Full Warranties & Documentation.

APO, FPO HI, AK Puerto Rico & Canadian orders Welcome: 6% - Minimum \$6. International Orders Shipped First Class. Mail Insured: 15% - Minimum \$15. If mail cost exceeds calculated amount, you'll be billed additional.

Call for Free Catalog and Items Not Listed

P.O.Box 17882
Milw, WI 53217
(414) 357-8181
FAX:
(414) 357-7814
HRS: CST
9am-9pm, M-F
11am-5pm, Sat

Prices fluctuate beyond our control & may change live better or worse. Defective returns must have a Return Authorization number. Call our 1-800-558-0003 to obtain a Return Authorization or your return will be accepted as such. No cash or credit given.

CD-ROM • CD-ROM • CD-ROM •

MAGNAVOX
External Combination CD-ROM Drive with CD-Audio Player
Call for Included Software Titles! **\$379**

CREATIVE LABS, INC.
SoundBlaster Pro Multimedia Upgrade Kit
Internal \$539 • External \$599
CD-ROM Drive Package
(If you already have Sound Blaster Pro)
Internal \$359 • External \$419

SONY
External CD-ROM Package CDU-7205
Call for Included Software Titles! **Call!**

MEDIA VISION
Multimedia PC Upgrade Kit Internal and CDPC External **CALL!**

SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE •

WE ARE ONE OF THE LARGEST MAIL ORDER COMPANIES FOR PC SOFTWARE -

If you don't find what you're looking for CALL US!

Auto Map	49 95	Norton Utilities 6.01	111 95	WordPerfect 5.1/Win	259.95/265 95
Design CAD 2D 5.0	165 95	Pacioli 2000	28 95	WinFax Pro	70 95
Design CAD 3D 3.1	168 95	PC Tools Deluxe 7.1	96 95	WE CARRY THE FULL LINE OF THESE PUBLISHERS: Ashlon-Tate • Borland Lotus • Central Point Microsoft • Quarterdeck Symantic • WordPerfect & much, much more!	
DESQview 386 V 6.0	129 95	Procomm Plus 2.0	62 95		
DR DOS 6.0	84 95	Q & A V 4.0	249 95		
Geoworks Pro	118 95	Qemm 386 6.0 NEW	59 95		
Laplunk 4.0	103 95	Stacker AT/16	175 95		
MS Excel 3.0 for Windows	309 95	Stacker 2.01	79 95		
MS Works for Windows	125 95	SuperStar	77 95		
Norton Desktop for Win V.1.0	95 95	Turbo Tax Personal	47 95		

For Service & Product that You Can Count on, Call 800-558-0003

COMPUCLASSICS ANNOUNCES MICROSOFT® WINDOWS™ 3.1

IBM

NEW!

NEW VERSION

\$95

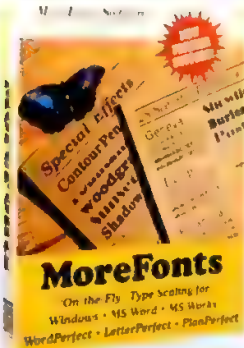


Ten million users already use the Microsoft Windows operating system, but now PCs just became easier to use. New features of Microsoft Windows include:

- Improved Setup automatically loads Windows onto your system.
- Faster printing and better output with TrueType® font technology.
- Better support for MS-DOS based applications allows you to copy and paste information into other applications for MS DOS or Windows.
- Improved File Manager with enhanced Drag and Drop capabilities.
- And thousands of Windows-based applications to choose from.

**Upgrade
\$55**

MICROSOFT WINDOWS 3.1 ENHANCEMENT PRODUCTS



\$75
MoreFonts

MoreFonts is the on-the-fly type scaling system you need to add style and excitement to WordPerfect, Microsoft Word, Microsoft Works and all Windows applications. The 28

included typefaces may be combined with your choice of outlines, patterns, shadows and backgrounds to create over 50,000 custom type styles at any size. Select fonts from within Windows applications or DOS WordPerfect, Works and Word. Print to any laser, inkjet and dot matrix printer. Package includes DOS and Windows Versions.

Zoom FaxModem
VFX V32bis **\$325**
with Winfax 2.0 *external or internal*



The high-speed Zoom V.32 bis FaxModem with Winfax 2.0. The best-selling brand in fax/modems is paired with great Windows fax software. With 14,000 bps uncompressed fax and modem speeds, the Zoom FaxModem VFX V32bis is 50 percent faster, sends and receives fax, and costs less than most V.32 modems.



\$99
Windows
Draw! 3.0

Windows Draw! is the fun, fast, and friendly drawing package for Windows. Windows Draw! delivers high-end illustration features for a fraction of the cost of competing

packages. Windows Draw! combines ease of use with advanced drawing features such as reshape points, object blending, Bezier curve editing, and text along a path to produce outstanding graphics. Includes 2600 high-quality clipart images to enable you to be productive immediately. A best buy—EASILY WORTH 3 TIMES ITS COST!

\$67
386MAX

Winner of the 1991 BYTE Award of Merit, PC Magazine's Editor's Choice Award, InfoWorld Buyers Assurance Seal, and InfoWorld's Top-Scoring Memory Manager, 386MAX® 6 is perfect for both experienced and novice users. 386MAX's new graphical interface seamlessly integrates memory management with SmartMemory™, a disk cache and a powerful system analyzer.



"WE KNOW WINDOWS"

CompuClassics
Your Source For Software

TO ORDER
OR INQUIRE
CALL

800-735-1993/818-347-7500/FAX 818-347-9977

**MORE=LARGEST SELECTION OF SOFTWARE TITLES
LESS=LOWER PRICES, LESS TIME WASTED TRYING TO FIND THEM**



Compuclassics

Your Source for Software

ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	
ACADEMIC		EDUCATIONAL		HEDGING		FASTBACK PLUS 3.04	

- ★ *No Minimum Orders*
- ★ *Same Day Shipping*
- ★ *Over 10,000 Titles Available*
- ★ *Latest Versions*
- ★ *Corporate PO's Welcome*
- ★ *Gov't, Educational PO's Welcome*
- ★ *International and FPO & APO Orders Accepted*

CALL US FOR PRODUCTS NOT LISTED • PLEASE SPECIFY DISK SIZE WHEN ORDERING

Immediate shipment on purchase orders from government and state agencies, cities, counties, schools and universities. • Prices subject to change without notice. • We ship the latest versions. • We accept VISA, MasterCard, Discover, JCB and American Express. • 15% restocking fee for all non defective items returned. • Please call (818) 347 9400 for an authorization number on defective goods or your return will not be accepted. • Due to copyright laws we cannot take back any software where the seal has been broken. • (Domestic sales) \$6.50 minimum shipping per item, less on bulk orders. • \$11.50 Blue Label shipping. • \$4.50 C O D charge. • International sales call for freight pricing. • Heavier items are charged accordingly. • We do not guarantee compatibility. • Call for prices for any software item not included in the ad. • Order desk open 7 A.M. to 5 P.M. Monday to Friday (PST), Saturday 10 A.M. to 2 P.M.

P.O. Box 10598, Canoga Park, CA 91309 • Showroom: 7959 Deering Ave., Canoga Park, California 91304



ACCPAC
SIMPLY ACCOUNTING
\$129

ACCPAC Simply Accounting is designed to work in small, fast-moving enterprises, with time-saving and no-nonsense features. And easy to learn! Just press the enter key, and you can have complete formatted balance sheets, income statements and many other reports. Provides password security to control data entry and prevent unauthorized viewing. (Specify DOS/Windows.)

APPRENTICE
\$99

Apprentice provides the power and productivity of Arts & Letters in an inexpensive package, offering users 3,000 award-winning clip-art symbols and 25 typefaces, as well as many other sophisticated features. Apprentice is easy to learn and use.



ADOBE 4.0
\$385

This new version of Adobe Illustrator 4.0™ software for Windows allows graphic artists, designers and desktop publishers to create professional quality illustration and design. Illustrator 4.0 offers edit in preview, on screen text, easier interface, resizable toolbox, powerful graphing tool, 24-bit color support and major performance enhancements.

AFTER DARK FOR WINDOWS

NEW

After Dark 2.0. Save your screen with over 40 incredible displays—5 Brand New Displays, Digital Sound, True Color Graphics, WallZapper, Network Password Support and MultiModule. Also DOS blanking to black password protection!

\$30

FoxPRO 2.0
Fastest DOS RDBMS available. Rushmore technology performs queries faster than a mainframe. Character-mode GUI and 4GL tools simplify screens, reports and data management. dBASE compatibility allows easy migration of applications.

\$479

RxPRO **PRO**



COMPU CLASSICS CARES

 For every copy of **Hijack** by Inset we sell this month, Inset will donate \$5.00 to replant a tree in America's forests. **\$125**

Compuclassics
TO ORDER OR INQUIRE, CALL
800-735-1993
818-347-7500
OR
FAX 818-347-9977

 Indicates Windows Compatible Products

"Advertising in PREMIER is one of the smartest decisions we've made!"

"We've advertised in PREMIER the very first issue, and it's one of the smartest decisions we've made."

Our ad produces consistent results from Fortune 1000 companies. PC Magazine PREMIER puts us in front of the people who play key roles in purchase decision-making. Anyone who believes that time is money should take the time to check out PREMIER!"

*Don Campbell
Campbell Services*



PREMIER offers the power of full-color advertising in two crisp, attractive ad sizes. When you're ready to advertise to the largest group of PC buyers in the industry, you're ready for PC Magazine PREMIER.

It's here...
PREMIER

1-800-825-4237

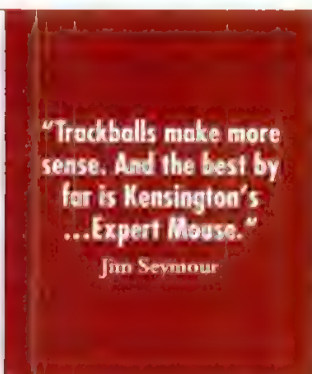


MAGAZINE

SOFTWARE

OCR Software	446
Accounting/Finance	446
AI/Expert Systems	
Automation	447
Bar Coding	
Business Time Management	448
CAD/CAM	
Contact Managers	
Communications/Networking	448
Database Management	
Desktop Organizers	
Desktop Publishing	
Education/Training	
Engineering/Software	450
Entertainment/Games	451
Fax Software	
Fonts	
Forms	

Graphics/Clip Art
Imaging
Integrated Software
Mapping
Music
Programming Tools
Project Management
Security
Shareware
Spreadsheets/Flow Charting
Statistical/Scientific
Tax/Investment
Utilities
Word Processing
Books
On-Line Services
Consulting
Services/Training



KENSINGTON

Turn Any Fax Machine Into A Data Entry Terminal.



Carvill Software

CIRCLE 1001 ON READER SERVICE CARD

WORLD FONT™ FOR WINDOWS

WITH EXCLUSIVE KEYMAPPER™ & AT/ATX

Bringing you the power of
scalable International typefaces
for Windows® applications!

عربي	ニホ	αρηα
Norsk	Türkiye	Polyz
Español	Français	Suomalainen
Ček	русская	עברית; עברית

Various font sets are available for the
languages of Europe, the Middle East, and Asia.

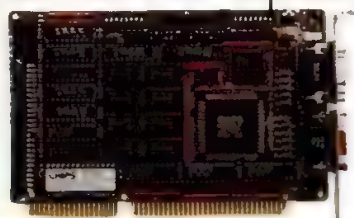
SPECIAL Order any font set from this ad and
SAVE 10% off our best catalog price!



DATA-CAL Corporation, Dept. C-7
531 E. Elliot Rd., Chandler, AZ 85225-1118
Phone 1-800-223-0123 FAX 1-602-545-8090

CIRCLE 1003 ON READER SERVICE CARD

WinSprint™ Power Windows With All The Options.



Speed

A WinSprint™ controller card will enhance your Windows® productivity and performance by running with the fastest speeds and the most impressive features in the industry.

Nobody's faster. WinSprint™ outpaces Super VGA by a factor of 4 to 11 times, making it the leader in the Windows® acceleration race.

It's a difference you will clearly see, thanks to resolutions up to 1600 x 1200 and 16, 256 or 16.7 million colors, depending upon which WinSprint model you choose.

Virtual Display

Yet, with all these features you'd expect to pay much more than just \$395.00 and that includes a 5 year warranty!



Finally, WinSprint includes a powerful feature we call Panoramic View. This dynamic panning feature extends your workspace to over 5 times that of a standard VGA display, allowing you to pan instantly just by touching the hot borders.



ARTIST GRAPHICS

A Control Systems Company

To add power windows and all the options, call toll-free 1-800-627-8478 or Fax (612) 631-7802

CIRCLE 1005 ON READER SERVICE CARD

Total Recall & Instant Recall



Made in USA

Powercard™ IPS

Instant Recall - Tired of having to open and close applications one by one every time you turn on or turn off your computer? With PCResume™, the perfect complement to Windows®, you can just hit a hot key and within seconds the entire computer's environment is preserved and saved to disk - even in the middle of processing. Upon returning, you can instantly resume your work exactly where you left off.



PCResume™

Total Recall - With Powercard™ IPS you get all that plus a built in battery backup system to totally protect your computer and data from power outages. Want to go home? Just turn the computer off - no matter what it's doing. It will preserve your computer's environment and then turn itself off.

The entire process takes about ten seconds. All modes of Windows® 3.0 and 3.1 are supported, as well as virtually all non-Windows® applications. PCResume™ and Powercard™ IPS - for power users who don't have time to waste.

For more information or where available, call toll free: 1-800-771-4764

© Copyright 1992 Powercard Supply, L.C. All rights reserved.

Windows is a trademark of Microsoft Corporation.

CIRCLE 1004 ON READER SERVICE CARD

UNICORE Presents

ROM BIOS UPGRADES

For Your IBM or Compatible - A New BIOS Upgrade Will

- Support Windows 3.0 • Support 360K, 720K, 1.2MB & 144MB Floppy Drives
- User defined hard drive types • Support VGA • Novell & Netware compatible
- Expanded hard drive table • Enhanced 101/102 keyboard • 100% IBM compatible
- Complete documentations • DOS 5.0 • Latest Version • Complete set up in ROM

FREE INTEL CHIP PULLER

Dealer Distributor Inquiries Welcome
ROM BIOS UPGRADES AVAILABLE FOR:

- IBM
- Acer
- Leading Edge
- DTK

- Sperry
- Northgate
- Tandy
- AST

- Hyundai
- Sanyo
- Samsung
- Wells American
- Wyse
- Kaypro
- Compuadd
- Compaq
- And Many More

ORDER TODAY
1-800-800-2467

UNICORE

1538 Turnpike St. • North Andover, MA 01845
1508 686-6468 • FAX 1508 683 1630

CIRCLE 1006 ON READER SERVICE CARD

Free Windows Tips*

Call Toll Free
1-800-223-8720 Ext. 726

* from The Cobb Group's newsletter
Inside Microsoft Windows.

**OUR WINDOWS REFLECT
WELL ON YOU!**

Your four-color ad in Premier's exclusive new Windows section—a brilliant showcase strictly for Windows advertisers—shows that you know where big buyers in big numbers shop direct for Windows products and support. Reach PC Magazine's 675,000+ brand specifiers where they come to buy every issue!

PC Magazine Premier Windows
Call 800-825-4537

The ESSENCE of WINDOWS.

ESSENCE GROUPS Innovative and advanced designs have satisfied many Fortune 500 companies, corporations, and educational institutions. Now with the introduction of the latest technology from Vario Systems' 32-bit Microchip and Motorola and ARCHITECT 32-bit M-III, you can significantly increase your overall computer performance. The Advantage of the 32-bit kernel is the 500,000cps accelerator. It not only increases your Windows performance but also AEM, ADM and other graphic intensive applications. With Essence Groups unconditional 30-day money back guarantee and one year limited warranty on parts & labor, gives you the biggest advantage of our system. No matter what you use your computer for, speed and performance are what you want. The Essence Group delivers it to you.



ESSENCE Media Group ORDER HOT LINE ONLY
(714) 546-3110

CIRCLE 1007 ON READER SERVICE CARD

MousePen^{Pro}

The Mouse You Use Like A Pen!



CIRCLE 1009 ON READER SERVICE CARD

Now Presenting. Thumbelina

The World's Most Versatile Mineral!

HOW
MUCH ARE YOU



CIRCLE 1010 ON READER SERVICE CARD

Your Windows™ Hand Scanner Solution...



ENVISIONS' ENV256 grayscale hand scanner and software bundle lets you promote your image at a super bargain! The ENV256 comes with Windows-based software for scanning graphics and text, as well as page composition software. Produces superior-quality black-and-white images with astonishing accuracy. Also excellent for optical character recognition tasks.

- True 8-bit gray scaling for lifelike images; 100-400 dpi resolution
- Scan in grayscale, halftone, or text modes; save as TIF, IMG, MSP, CUT, PCX, TGA
- 4.13" scanning width, or use ScanKit (included) to merge two scanned panels

...Includes All This Software!



Scan Text

Eliminate the chore of retyping data: **Recognita GO-CR Value \$395.**

- Recognizes text 6-24 points, for all types of documents
- Up to 99.8% accuracy; eliminates time-consuming corrections
- Recognition speed is a fast 1,500 wpm
- Saves in 30 different word processing formats and ASCII

For IBM PC and compatibles or PS/2 Windows 3.0 DOS 3.0 or later. Windows compatible display card, mouse.



Scan Graphics

Scan graphics/photos and enhance them with powerful **Picture Publisher LE Value \$95.**

- Advanced photographic editing and retouching tools
- Text tool lets you lay words over a graphic or photo
- Make image opaque or transparent for background

For IBM PC and compatibles or PS/2 Windows 3.0 DOS 3.0 or later. 1 MB RAM, hard disk, mouse.



Create Great-Looking Documents

Combine text & graphics for DTP: **SPC Professional Write Plus Value \$249.**

- Easy to learn for page composition and word processing
- Manipulates graphics and wraps text automatically
- Includes 24 style templates to take the work out of formatting

For IBM PC and compatibles or PS/2 Windows 3.0 DOS 3.0 or later.



...For Only \$299

1-800-321-3689 Local 415-692-9061 Fax 415-692-9064 885 415-692-9521

©1992 E.S.T., Inc. Burlingame, CA 94010 Shipping & Handling Please add \$10 Prices subject to change Restocking fees may apply

CIRCLE 1011 ON READER SERVICE CARD

The reasons for buying our bundle just keep stacking up.



For less than \$1000*, **Pentax IQ Scan-Camera WordScan** bundle is the intelligent choice for OCR scanning.

So call Pentax today for more information about decreasing your data-entry time and boosting your productivity.

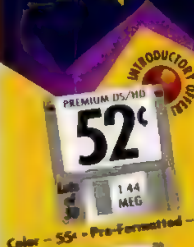
TECHNOLOGIES
100 Technology Drive
Broomfield, CO 80021
303-460-1600
FAX 303-460-1628

CIRCLE 1012 ON READER SERVICE CARD

MEDIA VALUE

EXCLUSIVE OFFER! ACTION PLUS SOFTWARE \$495, WHILE ABSOLUTELY FREE! Free with order of \$100 or more. OFFER VALID WHILE SUPPLIES LAST.

Roberta Wirtel
18 Years
Media Industry
Experience



Color - 55¢ - Pre-Formatted - 63¢



PRE-FORMATTED DISKETTES
3.5" DS/HD.....63¢
3.5" DS/DD.....39¢
5.25" DS/HD.....39¢
5.25" DS/DD.....25¢
Lots of 1,000.....25¢
Lots of 500.....27¢
Lots of 100.....29¢

PRE-LABELLED DISKETTES
3.5" DS/DD.....27¢
5.25" DS/DD.....15¢

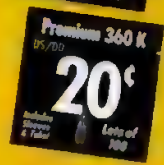
QUALITY DISKETTES LOW PRICES

Did you know that bulk disks are quality disks made by major manufacturers without a brand label?

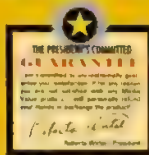
Did you know that you pay 30-50% more for brands?

Save money and buy these quality disks without paying for the brand label!

100% Guarantee On All Products
Call us first, our prices may be lower than advertised!



OTHER QUALITY PRODUCTS
We also carry ribbons, Data Cartridges, Storage Cases, and more. Please call for our latest price list.



VISA • M/C • COD'S **800-845-3472** FAX 408-727-3155

CIRCLE 1013 ON READER SERVICE CARD

MORE WINDOWS NOW!

Tecmar's MicroRAM 386™ Breaks The 16MB Memory Barrier.

With MicroRAM memory boards you can run MORE Windows FASTER than ever before.

- **Maximum Memory**
• Up to 32MB of extended memory - the highest in the industry
- **Runs Windows up to 50% Faster**
• Breakthrough performance across the board - 32 bit, Zero Wait State
- **Automatic Installation**
• No add-in cards
- **Versatile Options**
• Dual serial port • parallel port



For more information about the entire MicroRAM series of memory products call Tecmar at (800) 625-8560 or (216) 349-0600.

TECMAR
A RAM COMPANY

All Tecmar products are fully warranted against defects in materials and workmanship. Tecmar is not responsible for any damage to your system or data caused by the use of any Tecmar product. Tecmar is not responsible for any damage to your system or data caused by the use of any Tecmar product. All rights reserved.

CIRCLE 1014 ON READER SERVICE CARD

H.Co. has America's largest selection of

MEMORY UPGRADES

For Microsoft Windows 3.1

& we'll beat any USA advertised price.

WE CARRY MEMORY FOR ALL COMPUTERS AND LASER PRINTERS
AT **LOWEST PRICES GUARANTEED!**

IBM	TOSHIBA	AST	DELL	HP
COMPAQ	HEWLETT PACKARD	EPSON	NEC	intel
ZENITH	Apple	EVEREX	DRAM	Cyrix
All Products	PACKARD BELL	STANDARD SIMMS		
100% Guaranteed!	Panasonic OKI	& MORE...		

All Trademarks & Logos are in their respective companies.

H.Co. COMPUTER PRODUCTS 17922 Sky Park Circle #F Irvine, CA 92714	Orders 1-800-726-2477 Tech Support 1-714-833-3364 Information 1-714-833-3222 Fax 1-714-833-3389	INTERNATIONAL OFFICE: GERMANY: Thomas Schönbauer Charlottenburger ufer 18 1000 Berlin 10 TEL: 030/3429781 Fax: 030/3426310
---	---	--

CIRCLE 1015 ON READER SERVICE CARD

ZyXEL delivers.
14,400 bps fax/modems
with a 30 day money-back
guarantee* plus a 5 year warranty!

Starting at only
\$449

- V.32bis - 14,400/12,000 bps
- V.32 - 9600/4800 bps
- MNP[®] 5 - V.42bis Data Compression
- MNP 3 & 4 - V.42 Error Correction
- Class 2 - G3 Fax, V.17 - 14,400 bps send & receive
- DTE Speed from 300 - 57,600 bps
- AT Command Set and V.25bis
- Compatible with popular data/fax software products
- Free ZFAX software.** Windows[™] & MAC[™] fax software options available



U-1496B

U-1496 Stand-Alone Modem



800-255-4101

ZyXEL Communications Corporation

QJ NETWORKING

Phone: 714-693-0804 • Fax: 714-693-0705

*Subject to terms and conditions. ** Windows and MAC options available at additional cost. All trademarks are the property of their respective owners.

CIRCLE 1017 ON READER SERVICE CARD



NEEDS MEMORY!

And lots of it! Windows 3.1 requires 4 Megabytes of memory to run efficiently.

At Compatible Memories we do just one thing. Memory Boards. And we do them better than anyone else.

We make fully compatible proprietary memory products for practically every micro computer. Our boards are manufactured in the USA giving us complete control over quality. With 24 hour shipping and toll-free technical support you will be up and running efficiently in no time!

NOW!

A Special to Windows Users

30% discount through June 30th, 1992. Call our "Windows Needs Memory" Hotline Today.
*Satisfaction Guaranteed**

1 (800) 354-6789

Visa or MasterCard accepted.
*If not fully satisfied you may return your order within 30 days for a full refund.

COMPATIBLE
MEMORIES

©1992, David M. Friedman, Inc. All rights reserved. Compatible Memories and the compatible logo are registered trademarks of David M. Friedman, Inc. Windows is a trademark of Microsoft Corporation.

CIRCLE 1018 ON READER SERVICE CARD



Special!
\$99.50
Suggested List Price \$249

The only internal UPS that can Open and Close Windows

If you use Windows[™] there's only one internal UPS that can save the day when your power fails: AccuCard[™] 386 from Emerson. AccuCard fits inside your computer, so it doesn't take up space on your desk. And at only \$99.50, it won't take much space in your budget, either.



For sophisticated internal power protection, AccuCard is your best choice. And for Windows[™] compatibility, it's your only choice. Call:

Business Systems Connections
1-800-926-4329

with your VISA or MasterCard and we'll ship it out the same day!

Subcontracted Program Property © 1990-91 Intellect GmbH. Exclusively Licensed by Intellect (USA) LLC.

Full Page Color Scanner

SCANPLUS
(8-1/2"x14") Sheet
Feed Color Scanner

- 24 Bit • Up To 16.8 Million Colors
- HP • ScanJet Plus Emulation
- IBM Compatible • One Pass Scanning
- 300 DPI Resolution • Complete Kit Includes Utility Software • 256 Grayscale Mode
- Supports Most Popular Software Including **WINDOWS**
- Brand New • 1-Year Manufacturers Warranty

Software Options - w/ScanPlus Purchase

	Cash	CCC
ReadRight Version 2.01	\$199	\$204.10
Picture Publisher Plus	\$ 99	\$101.54
Wordscan - OCR Software	\$ 99	\$101.54

\$599

CCC-561416

PANASONIC
Low Cost, High Value Printers

PANASONIC
KX-P1123
A 24-Pin Printer At A 9-Pin Price

- 240 CPS Draft • 60 CPS LQ
- IBM and Epson Compatibility
- 10K Print Buffer
- 360x360 DPI Graphics Resolution
- 7-Fonts • 11.7" Narrow Carriage
- Paper Parking • PUSH-PULL Tractor
- Rear Bottom and Top Paper Feed
- 20 Function Operator Panel Controls
- 15.7" W x 13.4" D x 5.2" H
- Factory Renewed
- Full Factory 2-Year Warranty

CCC-183.66

\$179

PANASONIC
KX-P1124
Low Cost • Full Featured Letter Quality Printer

- 300 CPS Draft • 100 CPS LQ
- IBM and Epson Compatibility
- 12K Print Buffer
- 11-Fonts • 5 Draft • 8 Letter Quality
- 11.7" Narrow Carriage • Paper Parking
- PUSH-PULL Tractor • Facsimile Compatible
- 16 LCD Operator Panel Controls
- Rear Bottom and Front Paper Feed
- 16.9" W x 14.1" D x 5.6" H
- Factory Renewed
- Full Factory 2-Year Warranty

CCC-855.36

\$249

Electrified Discounters

1088 Sherman Avenue, Hamden, CT 06514

Orders Only **(800) 678-8585**

30-DAY MONEY BACK GUARANTEE
MC, VISA & Less Shipping
AMEX Accepted Charge

Customer Service & Technical Support
Mon-Fri 9:00 am - 5 pm EST (203) 287-1976

Hours: M-T 9am-7pm
F-S 10am-6pm
FAX 203-244-8680

Dealer Inquiries Invited
CCC is Credit Card Cost which is 21.9% (not responsible for typographical errors). Prices are subject to change without notice. Cash residents add 6% sales tax. Quotations are limited. Prices do not include freight.

CIRCLE 1018 ON READER SERVICE CARD

RECOGNITA
DESIGNER • CINCINNATI

Phone: 1-800-255-4400 R
Fax: 408-241-6009

Leave retyping to our OCR, and get your **FREE** hand scanner!

MS Windows based word processors are great, but many times you still have to retype text. Our software helps you to save time and spares you from this tedious task.

GO-CR

Designed for hand scanners and works directly from Windows based word processors. Recognizes over 80 languages with exceptional speed and accuracy and it only costs \$199. For limited time our price will include a **FREE** hand scanner.

CIRCLE 1049 ON READER SERVICE CARD

Take the Express...

to seamless integration of your SCSI peripherals.

Micro Design International has a complete line of LaserBank™ SCSI mass storage subsystems, including CD-ROM, WORM, Rewritable, Multifunction, Jukebox, Hard disk, and DAT. "Off-the-shelf" integration of these SCSI peripherals is achieved through SCSI Express™. Stop wasting valuable PC slots with multiple host adapters. With SCSI Express, a single host adapter can support up to seven different devices under: DOS, OS2, NetWare, SCO, Interactive and AT&T UNIX, and AIX. Finally, a SCSI storage solution that provides a powerful and seamless peripheral interface.

For more information call
Micro Design International
at (407) 677-8333
or FAX us at (407) 677-8365

Micro Design International
6985 University Blvd., Winter Park, FL 32792

CIRCLE 1019 ON READER SERVICE CARD

Trust The New York Times.

"CashBIZ™ can print invoices, maintain a chart of accounts, print simple business reports, track credit card balances and otherwise manage the financial tools of a small business...and it does so in a way that will not overwhelm a novice computer user with no training in business finance."

-The New York Times

CashBIZ, from the makers of Pacioli 2000™, is as easy-to-use at home as a simple check writer like Quicken™, but also has the features you need to run your business.

Order CashBIZ for Windows by June 30th and it's yours for only \$10.

Call Now: 800-933-6872

CashBIZ Only \$10
For Windows

M-USA Business Systems, Inc. • 15806 Midway Road • Dallas, TX 75244

All trademarks are property of their respective holders.

Order Code PCMW5

Offer valid only in Continental U.S. While supplies last. One per customer. Texas residents add 8.25% sales tax.

Value-Priced Windows® Applications and Utilities: All Titles Under \$40 \$30!!

A Wizardworks "Get Acquainted" Offer for Windows Users
Windows Utilities UNDER \$30!
Buy 2 Get 1 Free!

Find-It! Enhanced replacement for Windows file directory.....\$ 29.99

Screen Show Custom screen savers, password security and icons....\$ 29.99

Wallpaper Art Gallery Add dazzling graphic images to jazz up your Windows backgrounds.....\$ 29.99

Windows Launcher! Launch programs from a single menu and toggle between DOS and Windows...\$ 29.99

ORDER TODAY!

VISA and MasterCard Accepted

Windows Applications
UNDER \$40! NOW 25% OFF!

Business Letters Over 100 ready-to-use letters for fast and professional correspondence.....\$39.99 \$29.99!

Business Forms Over 100 ready-to-use forms.....\$39.99 \$29.99!

WinMail Full-featured mail list manager.....\$39.99 \$29.99!

Time Is Money Advanced financial calculations.....\$39.99 \$29.99!

Designer Labels Create and print any label.....\$39.99 \$29.99!

Banners On Parade Ready-to-use banners/signs/cards....\$39.99 \$29.99!

Windows "Edu-tainment"
UNDER \$30! 25% OFF!

PuzzleWorks Over 20 challenging "slide puzzle" games...\$24.99 \$18.75!

Blackjack.....\$29.99 \$22.50!

Call today toll-free:

1-800-848-4912 ext. 2421

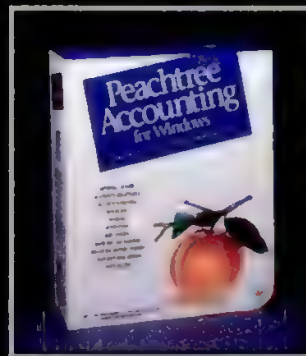
Or (612) 544-8581

WIZARDWORKS

5354 Parkdale Drive, Suite 104,
Minneapolis, MN 55416-9568

© 1992 The Wizardworks Group, Inc.

CIRCLE 1021 ON READER SERVICE CARD



Peachtree Accounting for Windows

Easy-To-Use Accounting For Small Businesses.

Peachtree® Accounting for Windows® is a fully integrated solution designed for small to medium-sized businesses. It includes General Ledger, Accounts Receivable, Invoicing, Accounts Payable, Payroll, Inventory, Job Costing, Bank Reconciliation, Financial Report Writer, Custom Forms Design and Data Access.

Peachtree Accounting for Windows now sells for only \$99. To order, or for a dealer near you, call Peachtree at 800-247-3224.



Peachtree
The first name in small business accounting software.

Peachtree is a registered trademark of Peachtree Software, Inc. Windows is a trademark of Microsoft, Inc.

CIRCLE 1023 ON READER SERVICE CARD

WIN!

..with RaceCom neural networks

Customers asked.
We delivered.

- ▶ Stock market investing.
- ▶ Commodity trading.
- ▶ Handicapping horse races.
- ▶ Betting on greyhounds.
- ▶ Picking the spread.

No matter where you invest, when you use RaceCom neural networks you're playing to win.

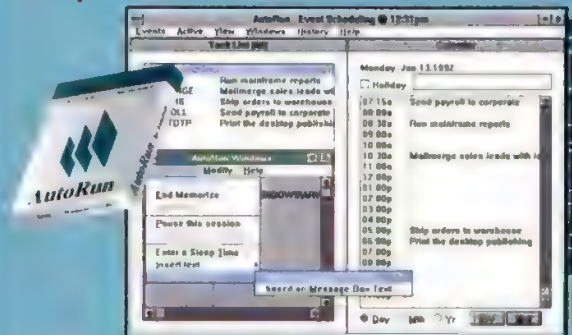
RaceCom

800-638-8088

555 W. Granada Blvd., Ormond Beach FL 32174

CIRCLE 1022 ON READER SERVICE CARD

Why Automate Windows?



Ten years ago, only a few people knew the term Word Processing. Now productive people type their letters on computers. Today, people who want to get ahead use AutoRun™.

Why AutoRun?

With AutoRun, you can reliably automate data collection, report printing, communications, backups and thousands of other tasks. AutoRun learns by watching what you do; it allows you to launch tasks from custom icons or schedule them by days or dates. AutoRun can even take care of business when you're away.

Why now?

Buy now and save \$30 on the most time-tested, time-saving utility you can buy. (Mention this ad and get AutoRun for only \$119. Regularly \$149.) To order your copy call 1-800-252-7144. All major credit cards accepted. C.O.D. available. AutoRun is available in DOS, Windows, single user and network versions. Contact: AutoSoft, Inc., 1003 Mansell Rd., Suite A, Roswell GA 30076.

Call 1-800-252-7144

CIRCLE 1024 ON READER SERVICE CARD

SEIZE THE DAY.



Now that you have Windows[®], get your hands on the best organizational tool for Windows users. Get **ACT! for Windows**. It's the newest product from the makers of ACT!, the best-selling contact manager on the market and winner of PC Magazine's Editors' Choice.

ACT! for Windows keeps all the details about an unlimited number of contacts (clients, suppliers, friends) at your fingertips, using an industry standard dBASE[®] file format. It also manages your daily, weekly and monthly calendar, including prioritizing all of your calls, meetings and to-dos. In fact, every form of communication is a snap. A built-in word processor with spell-checker lets you generate letters and memos with a few clicks of the mouse. You'll even find a convenient telephone auto-dialer and fax integration included. Reports, too, are easy. In addition to many standard reports, you can create an unlimited number of custom reports.

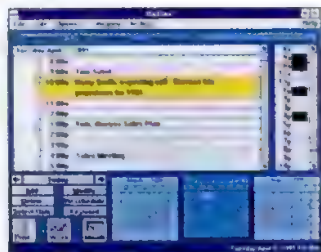
ACT! for Windows also supports DDE macros to link with Microsoft Word for Windows[®], WordPerfect for Windows[®] and Lotus AmiPro[®]. So if you're ready to seize a great opportunity, call us for more information or for the ACT! dealer nearest you. 1-800-365-0606 **ACT!** windows

All brands and product names are trademarks of their respective holders.
© 1992 Contact Software International 1840 Hutton Drive., # 200,
Carrollton, TX 75006 (214) 919 9500

CIRCLE 1025 ON READER SERVICE CARD

OnTime[®] FOR WINDOWS[™]

an easy-to-use lifetime calendar
and to-do list manager



OnTime[®] for Windows[™] focuses on doing one thing and doing it extremely well—managing your calendar. With OnTime you'll be more organized than you ever dreamed possible.

OnTime's famous tri-fold printout will knock your socks off. While powerful, OnTime is a snap to use.

Available at Egghead and other quality dealers everywhere.

THE CALENDAR OF CHOICE



"is little short of sensational!"
L.R. Shannon September 24, 1991
The New York Times



\$129⁹⁵

SINGLE VERSION PRICE
For information about OnTime's
network versions, call
800-345-6747
(All PC versions of OnTime also available)

CAMPBELL SERVICES INC.
MICRO SOFTWARE

CIRCLE 1026 ON READER SERVICE CARD

SequeLink[™] MiddleWare[™]

Open Windows for Client/Server Computing

While others have been dreaming of client/server computing, we've been putting it to work in the real world, in an unlimited range of hardware, software and network environments. SequeLink Client/Server MiddleWare enables direct access to server-based data from within Windows, Macintosh, UNIX, VMS and OS/2 using your current applications, networks and database management systems. You've heard enough talk about client/server computing. Now let us show you how it can work for you today!

A product of TechGnosis
301 Yamato Road, Suite 2200
Boca Raton, FL 33431.
(800) 321-0543
Fax: (407) 241-6143

ALL TRADEMARKS ARE PROPERTIES OF THEIR HOLDERS.

CIRCLE 1027 ON READER SERVICE CARD



"10NET IS THE #1 PEER-TO-PEER NETWORK FOR WINDOWS AND DOS."

More users have chosen 10NET to network their PCs than any other peer-to-peer network operating

system. Sitka 10NET 5.0 lets you share files, printers and databases directly with others in your office, all with the point-and-click ease of Windows[®].

Sitka 10NET 5.0 is built on industry standards specified by Microsoft[®], IBM[®] and 3COM[®], which means compatibility with virtually every PC, network interface card or cabling available.

10NET 5.0 Features:

- Supports up to 300 users.
 - Built-in Windows support.
 - Best printing and security features.
 - Compatible with all popular network interface cards.
- Call 1-800-445-8677 for the Sitka dealer nearest you. Try Sitka 10NET 5.0, and find out why over 650,000 users have made 10NET the #1 peer-to-peer network for Windows and DOS.



1-800-445-8677

© 1992 Sitka Corporation. 10NET is a registered trademark of Sitka Corporation. Windows, IBM, and 3COM are registered trademarks of their respective holders. Sitka Corporation, 351 Marina Village Parkway, Alameda, CA 94501

SITKA
A LINCOLN SYSTEMS COMPANY

CIRCLE 1028 ON READER SERVICE CARD

Your Most Important Business Tools Connected at Last.



windowphone™

Your personal call manager with Caller ID teleconnections.

The long awaited teleconnection between your PC and telephone is here today. Using Caller ID, WindowPhone creates a pop-up window to identify your callers whenever your phone rings and provides instant access to detailed customer information. It's a customer service dream come true. Only \$495 plus shipping and applicable sales tax.

1-800-424-8559

WindowPhone is a product of AG Communication Systems
2500 West Utopia Road, P.O. Box 52016, Phoenix, Arizona 85072-2016

CIRCLE 1006 ON READER SERVICE CARD

Discover The X Terminal Inside Your PC!

X-One 386 transforms your PC into an X terminal. With X-One and your plain 386 PC, you can access X Windows applications that reside on a variety of hosts on your network.

You can run X-One under MS Windows or DOS without purchasing two separate products. Powerful features like 256 color support, built-in TCP/IP, and a built-in VT100 window make X-One an even greater value. Plus, X-One is so easy to install, setup, and use.

So get X-One and get connected to the world of X windows!



GRAFFPOINT™
The X Connection®

1485 Saratoga Avenue
San Jose, CA 95129
408/446-1919
408/446-0666 Fax

Call For Demo & Details: 800/426-2230

X-One and The X Connection are trademarks of Graffpoint, Inc.
All other trademarks and logos are the property of their respective holders.

CIRCLE 1030 ON READER SERVICE CARD

INTRODUCING

eNOTE™

Sometimes the simplest form of communication is the best. **eNOTE for Windows™** provides an immediate link between you and your colleagues without the hassle of having to check your mailbox. Send notes directly through your network and they will automatically pop up at their destinations. This gives you the convenience of a paper note in a fast digital format.

You can even send **eNOTES** with documents, spreadsheets, and other important files attached directly to the note. Alarms can be set so that notes pop up later to remind you or others of important up-coming events.

eNOTE, the new approach to E-Mail.

For further information or to place an order,
Call 800-743-8645 Fax 201-200-9018



CHORD

Which is faster, a letter or a note?

CIRCLE 1029 ON READER SERVICE CARD

REACHOUT



Remote Control for Windows & DOS!

ReachOut lets you remotely control a distant PC running DOS or Windows as though you were there.

FEATURES

- Works in Windows and DOS
- Network and Modem Versions
- Supports VGA, SVGA (800x600), and EGA
- Background File Transfer

Special Offer

MODEM VERSION 2.1

Only **\$79**

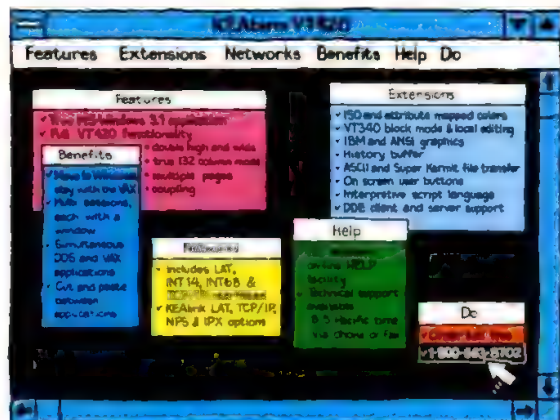
TO ORDER CALL

(800) 677-OCEAN
49 Royal Palm Blvd
Vero Beach, FL 32960
(407) 770-4777

Ocean Isle

CIRCLE 1031 ON READER SERVICE CARD

Move to Windows, stay with the VAX.[™]



VT Emulation under Windows

KEA has VEmulation and connectivity products for your PC. KEAterm VEmulation for MS-Windows, ZSTEM VEmulation for MS-DOS and SCO UNIX, the *PowerStation* VT layout keyboard for your PC, and KEAlink network products for connecting to your VAX or UNIX host. Coming soon: KEAterm VT340 emulation for Windows.

Tel: (604)431-0727 Fax: (604)431-0818 Orders: 1-800-663-8702

KEA Systems Ltd., 3738 North Fraser Way, Unit 101, Burnaby, BC, Canada V5J 5G1

Copyright © KEA SYSTEMS LTD. 1992. All rights reserved. KEAterm, KEAlink, PowerStation, ZSTEM and the KEA logo are trademarks of KEA Systems Ltd.

All other brand and product names are trademarks or registered trademarks of their respective holders.



CIRCLE 1032 ON READER SERVICE CARD

QFD Designer[™]

BUILDING
CUSTOMER
SATISFACTION



Satisfying customers is not always easy—success depends on giving them what they really want. **Quality Function Deployment (QFD)** is a team approach that puts customers first during product development. With **QFD Designer[™]**, creating QFD charts becomes quick and easy. Take a look at QFD Designer[™] before your competition does. 30 day money-back guarantee.

QFD Implementation and courses:

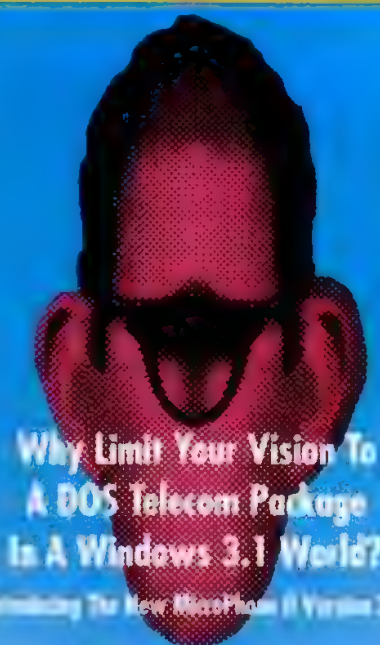
American Supplier Institute
15041 Commerce Drive S.
Dearborn, MI 48120
(313) 336-8877 • Debra Hopton

QFD Designer[™] software:

Quarksoft Corporation
7395 Bridgeway West
West Bloomfield, MI 48322
(313) 626-4070 • Mark Miller

Free demonstration disks available

CIRCLE 1034 ON READER SERVICE CARD



Why Limit Your Vision To
A DOS Telecom Package
In A Windows 3.1 World?

[Introducing The New MicroPhone II Version 2.1]

MicroPhone[™] II for Windows 3.1 is a true Windows telecom product—designed from the ground up with Windows in mind. Now new Windows 3.1 features are in your sight. Like Drag and Drop. Multimedia extensions. TrueType fonts. Plus powerful Windows hallmarks like DDE and multi-session capability. All you need for superb telecommunications. With a clear focus on Windows 3.1.

MicroPhone II Version 2.1 for Windows 3.1

© 1993 SOFTWARE VENTURES CORPORATION
2907 CLAREMONT AVE., BERKELEY, CA 94705 • PHONE: (510) 644-3232 FAX: (510) 848-0885
MICROPHONE IS A TRADEMARK OF SOFTWARE VENTURES CORPORATION. ALL OTHER PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES.

CIRCLE 1033 ON READER SERVICE CARD

WE DO WINDOWS BETTER!

The biggest computer publication of all time, and the most regularly read publication among PC buyers, delivers 870,000+ PC brand specifiers—by far the lion's share of buyers for the record-breaking 5 million copies of Windows sold in just 18 months. Now, you can showcase your Windows product or service with four-color advertising in an exclusive set of display pages reserved exclusively for Windows advertisers. Open up your Windows sales opportunities in **PC MAGAZINE PREMIER WINDOWS**

Reserve your space today!

Call 800-825-4237

Design and Build the City of Your Dreams.



SimCity® for Windows™

As Mayor and Planner, you control the events that affect your city. Fight crime, unemployment, and pollution. Control budgets, taxes, and transit systems. Deal with disasters and public opinion.

SPECIAL OFFER

Buy **SimCity** for Windows now at a special price of **\$49.95** (\$10.00 off the retail price) and receive the *SimCity Planning Commission Handbook™* (a \$14.95 value) **FREE!**

Call 1-800-33-MAXIS now!

Offer Expires January 31, 1993

Ad Code: EEH508



Windows and SimCity Planning Commission Handbook are trademarks of their respective holders.

CIRCLE 1036 ON READER SERVICE CARD

Clip-Art Shopper Downloads Individual Images by Modem!



Graphics add attention-grabbing punch to your publishing. Now award winning **Clip-Art Shopper** brings you individual graphics online. Any time of day you can logon to obtain just the image or images that are best suited for your project. Select the image from our extensive graphics database of over 20,000 images from the top 17 publishers of professional clipart. Pay only for the images you choose, which are then instantly downloaded for your immediate use. *It couldn't be simpler.* Try **Clip-Art Shopper** today and start saving time and money!

Clip-Art Window Shopper.....\$69.95

Call now for 20% off!
1-800-234-9497



CIRCLE 1037 ON READER SERVICE CARD

WINDOWS

Convert Any Typeface Format Into Any Other! *

AllType®

The Universal Typeface Converter

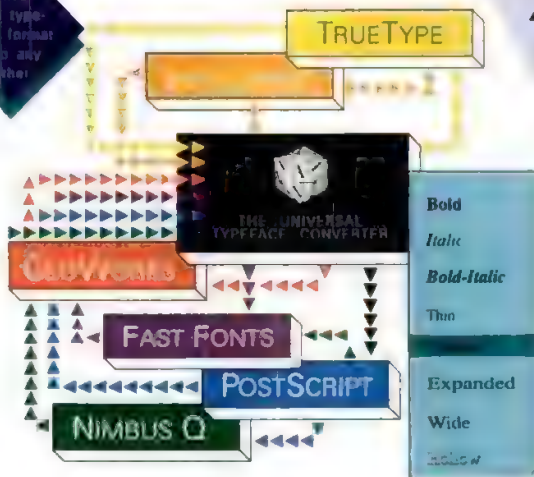


FREE BONUS!

2 Type Families
included
(a \$30 value)

\$79.95

Plus \$7 shipping



Now use any typeface in any application, quickly and easily*

- ▲ Windows 3.1 Compatible
- ▲ Automatically Installs Typefaces
- ▲ Create Typeface Variations
- ▲ Rename Typefaces

- ▲ Create hundreds of variations of your original typeface with custom styles and widths while retaining hinting data for high quality printer output

Atech Software

5964 La Place Ct
Suite 100
Carlsbad, CA
92008



Order Now Toll Free:

800-786-FONT (3668)

Outside the U.S. (619) 438-6883 • Fax Orders (619) 438-6898

PCM428A

* Supports all major font formats. Requires Windows 3.1 or a scalable font printer, application, or font manager.

CIRCLE 1038 ON READER SERVICE CARD



Fluent Laser Fonts

Large Font Libraries at Prices You Can Afford!

We've got it all!
PostScript and TrueType fonts, Adobe's ATM, & an exceptional WordPerfect installer - In Each Package...
...Beat That!

- Quick, easy installation & use
- Adobe's ATM for Windows, FREE
- Provides both font formats (PostScript Type 1 & TrueType)
- Exceptional WordPerfect Installer

Current PC Type Libraries

Library I
\$189.95 retail - 79 Typefaces

Library II
\$139.95 retail - 35 Typefaces

Glasnost Cyrillic Library
\$200 retail - 21 Typefaces

Eastern European Library
\$200 retail - 30 Typefaces

Want to Save 40%?

Call or fax Gallian about special Windows 3.1 introductory prices! 40% off retail prices above.

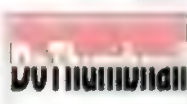
1-800-359-4920 or 408-484-9228 FAX 408-484-9218

CIRCLE 1039 ON READER SERVICE CARD

When It Comes To Graphics, We Never Miss A Bit!



\$69.00



\$79.00



\$89.00



\$99.00



\$189.00

DoSNAP captures full screen, area, window dialog box, pull-down menu icon and arbitrary shape. Print the captured image to printer (used as the Print Screen key). Save to 9 popular file formats (TIF, BMP, WordPerfect, GIF, PCX, etc.).

DoThumbnail is the image manager that creates thumbnail image databases from over 50 graphics file formats. Find images using keyword search or simply by scrolling through thumbnails.

DoVIEW supports viewing of over 50 different graphics file formats. It is fully integrated with the Windows File Manager and has automatic file format detection. Double click on the file name and the graphics image is displayed.

DoCONVERT converts between 50 different graphics file formats. Supports Macintosh PC, Windows, UNIX, and mainframe file formats. Supports batch conversion with simple to use control commands.

DoDOT provides an environment that integrates all four programs into an easy-to-use graphics shell, plus supports for scanner, fax, color/grayscale, image processing and more.



Halcyon Software

Call us at (408) 378-9898 for the dealer nearest you.

1590 La Pradera Dr., Campbell, CA 95008
Tel: 408/378-9898 Fax: 408/378-9935

CIRCLE 1040 ON READER SERVICE CARD

100% Satisfaction Guaranteed

INTRODUCING SOMETHING NEW IN SHAREWARE. QUALITY.

All our shareware is fully functional, performance tested and ASP approved. Stored on a "read-only" system for your protection, each program must still pass 3 intensive quality checks including the most current version of Central Point® Anti-Virus.

Members can download the latest version of each program from our on-line BBS ordering system, or we'll ship it in a sturdy bend-proof mailer — the same day, if we receive your order by 3 pm PST.

Membership is just \$20 per year, and benefits include:

- \$5/program, no matter how many disks. S&H included
- first 10 programs FREE
- instant on-line BBS delivery
- toll-free 24-hour order phone
- toll-free technical support

every 10th program FREE!
free membership kit
monthly newsletter
catalog updates and special offers

Call or send for your free catalog, or join today and receive our most popular game FREE with your membership kit.

Call 1-800-322-1750
VISA, MasterCard, Discover Card, American Express. No cash and no charge.



ASP Approved Vendor

ShareWare Club membership card. The card is black with a yellow diamond shape in the center containing the text 'the ShareWare Club'. Below the card, it says 'ASP Approved Vendor'.

217 First Avenue SE, P.O. Box 1750, Duvall, WA 98019-1750 Phone (206) 788-7424 Fax (206) 788-7304

CIRCLE 1041 ON READER SERVICE CARD

"I'll print the letter IF I can find it"

Ready, Aim, FILE!

Content is What Really Counts

Ready Aim File! is a powerful file manager that lets you find files and folders in seconds. It's the only file manager that lets you search for files and folders by name, date, size, type, and location. It's also the only file manager that lets you search for files and folders by content. Ready Aim File! is a powerful file manager that lets you find files and folders in seconds. It's the only file manager that lets you search for files and folders by name, date, size, type, and location. It's also the only file manager that lets you search for files and folders by content.

You Already Know How to Use it

Ready Aim File! is a powerful file manager that lets you find files and folders in seconds. It's the only file manager that lets you search for files and folders by name, date, size, type, and location. It's also the only file manager that lets you search for files and folders by content.

ONLY \$99.95 (MSRP)

Call Today! (714) 733-1619

Make Windows & DOS Work For You

Ready Aim File! is a powerful file manager that lets you find files and folders in seconds. It's the only file manager that lets you search for files and folders by name, date, size, type, and location. It's also the only file manager that lets you search for files and folders by content.

VSoft

301 South Beverly Dr.
Beverly Hills, CA 90212

CIRCLE 1042 ON READER SERVICE CARD

Tuning and Troubleshooting for Microsoft Windows

QAPlus/WIN™

LAN Compatible Diagnostics, System Information, and Performance Benchmarking



The industry has been clamouring for this since Microsoft Windows 3.0 came out, and now it's here to help you realize the full potential of Windows 3.1. QAPlus/WIN provides diagnostic tests for every major component on your PC, including FAX modems, multimedia devices and LANs. It features icons for easily selecting tests and system information and includes extensive help with tips on how to get the most out of

your system. It even includes software so service and support personnel can run QAPlus/WIN remotely to test your system. Its Windows Resource Control Center guides you through comparing and editing your system configuration files. QAPlus/WIN also provides LAN support for up to 4 users, with recording of test results and system configuration information into a multi-user dBase IV™ file on the network server.

DiagSoft, Inc., 5615 Sooma Valley Drive, Suite 140, Sooma Valley, California 95066 • 1-800-DIAGSOFT • 1-408-438-7113 FAX
Suggested Retail: \$159.95 • Call for the dealer nearest you.

CIRCLE 1043 ON READER SERVICE CARD

WINDOWS WITHOUT A MOUSE



Faster too!
A must for Laptops!

K-U-I

"The" Keyboard User
Interface for Windows

- Hot keys instantly launch/switch applications
- Command line interface with aliases
- Mouse simulation from your keyboard
- Cursor selection for improved visibility and
- K-U-I Lens magnifies anything on-screen
- Much more ...

Only \$79.95

Softac Corporation
23 Sunset Rd.
Winchester, MA 01890

30 Day Money Back Guarantee
Toll Free 1-800-433-0486
Tel: (617)-721-1010

CIRCLE 1044 ON READER SERVICE CARD

NEW VERSION! AFTER DARK 2.0 FOR WINDOWS™

Check 100+ multimedia features to prevent computer crashes, loss of memory, crash logs and more. Plus, it's easy to use and install.

- BRAND NEW DISPLAYS
- DIGITAL SOUND
- WALLZAPPER™ Instant Wallpaper Creator
- TRUE COLOR GRAPHICS
- MULTIMODULE



CIRCLE 1045 ON READER SERVICE CARD



Only The Writer's Toolkit Has All The Tools To Improve Your Writing

This is much more than a simple grammar checker. The Writer's Toolkit combines seven references that work directly with any DOS or Windows word processor.

- CorrecText Grammar and Style Checker
- American Heritage Electronic Dictionary
- Columbia Dictionary of Quotations
- Roget's II Electronic Thesaurus
- Houghton-Mifflin Abbreviation Program
- The Dictionary of Common Knowledge
- The Written Word III

Call for Free Demo Disk
1-800-333-1395

Systems Compatibility Corp.
401 N. Wabash Ave., # 600, Chicago, IL 60611

CIRCLE 1046 ON READER SERVICE CARD

PC MARKETPLACE

INDEX

Windows

An every-issue four color section featuring quality products for the Windows environment.

441-543

Premier

The color showcase that puts the spotlight on leading-edge PC products and services.

455-463

Classified

Flexible-format display advertising: computer systems, components, software and more.

464-475

BusinessCard

A forum for innovative, hard-to-find and low cost PC hardware, software and services.

476-479

	Premier	Classified	Business Card		Premier	Classified	Business Card		Premier	Classified	Business Card
HARDWARE				Communications/Networking	459	467	477	Public Domain/Shareware		470	
Add-In-Boards	455	464		Computer Languages			477	Real Estate			478
CD-ROM	455	464	476	Construction				Religion	462	470	
Communications/Networking	455		476	Data Base	460		477	Sales Marketing			478
Computer Systems	455	464	476	Data Entry		468		Scientific			479
Connectivity				Desktop Publishing	460			Security	462	470	
Disk Drives	456		476	Diagnostic				Statistics			479
Diskettes		465		Education	460			Surveys			479
Expansion Units		466	476	Engineering		468		Taxes			
Input Devices	457			Entertainment/Games		468	477	Utilities	463	471	
Laptop/Portables				Financial	460	468		Windows		471	479
Monitors		467		Flow Chart	461	469		Word Processing			
Peripherals	457		476	Fonts				MISCELLANEOUS			
Peripheral Sharing Devices				Foreign Languages		469		Accessories	463		
Power Supplies				General			477	Bar Coding	463	471	479
Printers	458	467	476	Graphics	461	469		Books/Catalogues			
Rentals				Health	462		477	Business Opportunities			479
Security				Inventory			477	Data Conversion		472	479
Storage				Mailing Programs		469	478	Data Recovery Services		472	
Tape Drive Subsystems	458	467		Maintenance/Preventive Maintenance			478	Desktop Publishing Services			
SOFTWARE				Manufacturing		469	478	Disk Conversion		472	
Accounting	459	467	476	Mapping			478	Diskette Copy Services		475	
Backup Systems				Medical			478	Insurance		475	
Business			476	Multi-User Systems				On-Line Services			479
Business Time Management				Music	462	469		Services			479
CAD/CAM	459		477	Programmers Tools		470	478	Supplies		475	479
				Project Management				Training/Tutorials			

PC MAGAZINE MARKETPLACE • 1 Park Avenue, 3rd Floor, New York, NY 10016

For information on advertising in Windows, Premier, Classified, or BusinessCard, contact your account representative or call 1-212-503-5115 or 1-800-825-4237



BLAST YOUR MESSAGE THRU!

Voice Mail • Telemarketing • Call Processing

Transform your PC/XT/AT/386 into a multi-line processing command center to intelligently process your sales, inquiries, and messages. Complete package.

Multi-Line \$995
SINGLE LINE \$295

For Sales or Information
Call 1-800-934-4884

(Developer/DEM packages available)
/ISA—MC—AMEX—COD

TALKING TECHNOLOGY, INC.
1125 ATLANTIC AVE. • ALAMEDA, CA 94501

CIRCLE 1050 ON READER SERVICE CARD

COREL

on CD-ROM

Learn from the pros through the power and versatility of CD-ROM!

Artshow includes:

- a dazzling collection of over 1200 images from the CorelDRAW International Design Contests
- a companion 120 page full-color coffee table book featuring contest designs
- a combination of online MIDI music, artwork and user interface for an exciting new multimedia experience!

\$99

Call Corel today!

Tel: 1-800-835-6245
Fax: (617) 378-9790
Can Tel: (617) 378-9450

CIRCLE 1051 ON READER SERVICE CARD

Super Buy 486/386 VGA Portable

386SX FROM \$1399

40MB HARD DISK (UP TO 330MB) 386-33 \$1599
2MB RAM (UP TO 8MB OPTION) 486-33 \$1899
1.2 OR 1.44MB FLOPPY
102 KEY KEYBOARD
SERIAL/PARALLEL PORTS
32 GRAY SCALE DISPLAY
2 YEAR LABOR 1 YEAR PART WARRANTY
CHECK OUR SYSTEM PRICE
ON DESKTOP & NOTE BOOK

Tel: (714) 994-0605
Fax: (714) 994-0858



COMPUTOP INC

14634 Firestone Blvd
La Mirada, CA 90638

SINCE 1987



CIRCLE 1052 ON READER SERVICE CARD

HARDWARE/ADD-IN-BOARDS-COMPUTER SYSTEMS

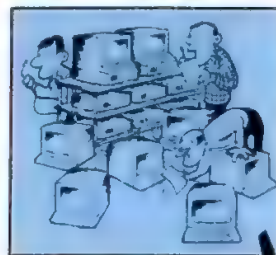
**CONTROL UP TO 96 PC
FILE SERVERS WITH 1 KEYBOARD
AND MONITOR USING...**

COMMANDER

by cybex



- Select via keyboard
- Dual access up to 250 feet away optional
- No external power
- Mix PC, PC/XT, PC/AT and PS/2
- AutoBoot™ Feature boots attached computers without operator intervention
- Shows PC power status



- PS/2 Mouse support available
- Each unit accommodates from 2 to 8 PCs
- Up to 12 units can be cascaded
- Mounting kit available for 19" and 24" rack installation



Dealer Program Available

Cybex Corporation

2800 H Bob Wallace Ave • Huntsville, AL 35805
(205) 534-0011 • FAX (205) 534-0010

CIRCLE 1053 ON READER SERVICE CARD



Ariel Design, Inc.
COMPUTER SOLUTIONS



**UPGRADE!
to AMI
386/486
Cache**

MOTHERBOARDS & SYSTEMS

- AMI 386SX-20, 25, II 32Kb Cache, Integrated I/O
- AMI 386-25, 33, 40 Mark V, 64/256Kb Cache, Integrated I/O
- NEW!** AMI 486SX-20, 25 Voyager SX, Integrated I/O
- NEW!** AMI 486SX-33, 50 Baby Voyager 64/256Kb Cache, Integrated I/O
- Micronics 386SX-25 32Kb Cache, Integrated I/O
- Micronics 386-33 64/256Kb Cache
- NEW!** Micronics 486SX-25 with optional external Cache
- Micronics 486-33 50 64 256Kb Cache
- NEW!** AMI 486SX-20 25 EZ-FLEX EISA upgradeable Integrated I/O
- NEW!** AMI 486-33 50 EZ FLEX & Enterprise II EISA 128Kb Cache
- AMI Fast Disk EISA SCSI Host adaptor w/386SX 16 processor 1-4 16MB Cache

**Motherboards from the industry leader. 1 Year Limited Warranty.
Toll Free Tech support. Call for the best price. AMIDIAG \$78**

145 Webster Street • Hanover • MA 02339
1-617-982-8800 • Fax: 1-617-982-9095

1-800-88Ariel

CIRCLE 1054 ON READER SERVICE CARD

The Portable Office

High Performance Notebook - 25MHz

\$2495



The Inex 3000, 386SXL-25 Features:

- 25 MHz CPU, 4 MB RAM and 40 MB hard disk.
- Large 10" VGA display with 64 gray shades.
- Only 5.9 lbs. including battery.
- I/O ports include: serial, parallel, external XT Bus, modem/fax modem, external PS/2 mouse and keyboard, and external VGA monitor.
- MS-DOS 5.0, NiCd battery, power adaptor and carrying case.
- Options including numeric coprocessor, RAM expansion to 6 MB or 8 MB, and hard disk of 60 MB or 80 MB, internal modem, internal fax modem, PS/2 keyboard and mouse adapter, additional battery packs and XT Bus module. Ideal for windows applications.
- One full year limited warranty.

To place your order or for more information, please call

PETRONIC INTERNATIONAL, INC.
1-800-777-7626 (TOLL FREE) FAX (316) 685-9368

CIRCLE 1055 ON READER SERVICE CARD

SCSI II Dart™ RAM Drive...



**BREAKS
THE
BOTTLENECK**
in your processing productivity!

One of the fastest drives available.

- 0.1ms access time, up to 12MB/sec. transfer rate.
- Works with PCs and Macintosh computers.
- Built-in battery backup provides data safety.
- Work with huge color graphics file easily.
- Ideal "virtual volume" when using virtual memory.
- Ultra-fast LAN file server.
- Accelerates sorting and reporting in database and accounting applications.



INNOVATORS IN
POWER &
PERFORMANCE

Newer
TECHNOLOGY

1-800-678-3726

7803 E. Osie, Suite 105
Wichita, Kansas 67207
Phone (316) 685-4904 • Fax (316) 685-9368

CIRCLE 1057 ON READER SERVICE CARD

436-333

Motherboards

\$775.00

Intel 486DX-33/40/50 MHz CPUs Premium Quality
64/256K Cache One Year Warranty
OPTI Chipset & AMI BIOS Money Back Guarantee
Socket for Weitek 4167 Baby AT Size
Up to 32MB RAM on Board Comprehensive Manual

Air Freight Shipping Included on Prepaid & Credit Card Orders

Graphic Computer Systems

1-800-375-0444

(915) 697-0444 (Main)
(915) 520-0444 (FAX)

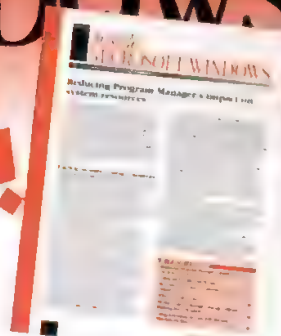
**Toll-Free Order &
Tech Support Line**

3301 Camarie
Midland, Texas 79702

CIRCLE 1056 ON READER SERVICE CARD

WINDOWS

FREE TIPS!



Inside Microsoft

Windows is full of tips and techniques to help you use Windows more productively. ♦ *Inside Microsoft Windows* provides practical "how-to's" and timesaving shortcuts you can use immediately. ♦ *Inside Microsoft Windows* is from The Cobb Group, the nation's leading publisher of software-specific journals.

Call for your **FREE ISSUE** today!

1-800-993-8790
Ext. 1001

Access All The New Technology ROM BIOS Upgrades from \$59.95

Affordable, easy-to-install ROM BIOS chips turn on all your computer's capabilities.

We stock quality AMI, Phoenix and Mr. BIOS upgrades for every IBM and compatible from ACER to ZEOS

Here's a small example:

AMI-XT.....	\$59.95
PHOENIX-IBM-AT.....	\$89.95
MR. BIOS-286.....	\$99.95
AMI-INTEL 386.....	\$89.95
MR. BIOS-OPTI 386.....	\$129.95
MR. BIOS-INTEL 486.....	\$129.95

And many more

Memory Upgrades From \$13.

Call Us First For All Your Upgrade Needs
• Video Cards • Floppy & Hard Disc Drives

AMI-TTI-MOTHERBOARDS-CALL FOR PRICE.

FREE BONUS

Now, with any memory purchase you'll receive **FREE \$10 Value** supply of Daily Multi-Vitamins. Our gift to you

THUNA
UPGRADES, ETC.

CALL FOR FREE CATALOG

1-800-955-3527

24hr. FAX Order Line (805) 650-6515
2432 A Palma Vista, CA 95003 • 805-650-2030
Corp. and University P.O. 1 • Waukegan, IL

Power Products • Upgrade Doctor • Service • Technical Support • Educational Discounts

CIRCLE 1058 ON READER SERVICE CARD

ANYONE
CAN INSTALL
BACKPACK.



It's never been easier to add an external diskette drive! In fact, if you can plug in a printer, you can install Backpack from Micro Solutions. Backpack connects to the parallel printer port of any PC compatible or portable - without inter-

face cards or tools! Several computers can share one Backpack, and Backpack is available in 3.5" and 5.25" diskette as well as tape and hard disk models. So stop monkeying around! Call today for more information.

backpack

MicroSolutions
Computer Products

132 W. Lincoln Hwy., Dr. Kalb, IL 60115 815-756-1411 Fax 815-756-2928

CIRCLE 1098 ON READER SERVICE CARD

DISK DRIVES-PERIPHERALS



Get the right
connections for \$179.
The MiniSCSI
Parallel-to-SCSI Adapter

Add a SCSI port to almost any printer port with our pocket-sized, self-contained MiniSCSI. Ideal for laptops, notebooks and systems which can't accommodate a standard SCSI interface, the MiniSCSI also lets you relocate SCSI devices easily.

- CD-ROM, hard disk, magneto-optical, SyQuest & Bernoulli support
- SCSI tape support available
- Retains use of parallel port
- Powered by SCSI bus
- Lightweight (only 2.5oz.)
- 2-year parts & labor warranty
- Other SCSI adapters available

"Genuinely interesting hardware department... Good idea"

John C. Dvorak, PC Magazine

"The neatest gadget at the CD-ROM show"

Jerry Pournelle, InfoWorld



Call: 510-770-1400

Trantor Systems, Ltd.

5415 Randall Place,

Fremont, CA 94538-3151 USA

(510) 770-1400 • Fax: 770-9910

Reseller Inquiries Welcome

© 1992 Trantor Systems, Ltd. All product names are trademarks or registered trademarks of their respective owners

CIRCLE 1081 ON READER SERVICE CARD

UnMouse™

The Intuitive Touch Tablet

Moving the cursor has never been easier - just slide your finger over the UnMouse, and press to click. And running macros has never been simpler - just use the built-in keypad. Slip in a preprogrammed template (or create your own) for instant access to 60 macros per program. No more memorizing multiple keystrokes or making extra mouse-and-keyboard movements.

- So easy, it's intuitive
- Programmable keypad is ideal for custom applications
- Stationary; saves space
- Draw, trace, or annotate, too

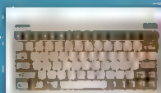
Call your dealer or
1-800-UNMOUSE



Tel: 508-694-9900
Fax: 508-694-9980

MicroTouch®

CIRCLE 1060 ON READER SERVICE CARD



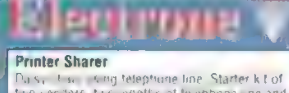
Miniature Keyboard

41 keys give many access to all the keys of 102 enhanced 1.25 by 0.75 for PC, AT, PS/2 and compatibles. Only function keys reduced size.

Keyboard with Trac Ball

Full 102 keyboard plus enhanced built-in Trac ball. 20" x 18" x 1.5" for details.

Call for Free
Brochure



Printer Sharer

Share a low-cost telephone line. Starter kit of two simulators, 10' lengths of telephone wire and one telephone or a replacement of \$129.50. Limited quantities at this price.

Key Pad

Symbolic pad 6 by 4. 18 keys. Fits to serial port.

Wrist Rest

Ease the strain on tired arms. This device will allow you to rest your arms to glide across the keyboard with the greatest of ease. Available in double or single.



Electrone Easy Scanner

Stabilizing system for hand-held scanners up to 8" wide. Firmly holds original and tracks hold scanner. Grid marks for up to 10" square and metric A4.

800-821-9382 USA 213-311-5000 FAX (909) 351-5000
Canada ELECTRONE

CIRCLE 1082 ON READER SERVICE CARD

ANNOUNCING Computer Select™

The Most Complete
Database of Computer
Product Information
Available

With COMPUTER SELECT you'll never again risk making the costly mistake of acquiring the wrong product. Now, using your own PC, you can identify, evaluate and select the best products that meet your requirements and your budget. Easy-to-use search software lets you quickly retrieve the documents you need from the vast database of product reviews, specifications, announcements and buyer's guides.

Get instant access to more than...

- 70,000 articles and abstracts each month
- Complete specs for 70,000 hardware, software and communications products
- Profiles of 12,000 companies, including addresses and phone numbers
- 9,000 definitions of computer and telecommunications terms.

Discover the power of this new CD-ROM product. Call

now for your free, no-obligation demo disk. Then, if you wish, you can subscribe for \$995.*

LIBRARY™

One Park Avenue,
New York, NY, 10016

**CALL NOW FOR A FREE
DEMONSTRATION DISK
212-503-4400**

Computer Library and Computer Select are trademarks and Data Sources is a registered trademark of Ziff Communications Company ©1991 Ziff Communications Co.

*U.S. and Canada only. Outside U.S. \$1195

PRINTERS-TAPE DRIVE SUBSYSTEMS



**Easy,
Networkable
Windows
Faxing!**

**Faxes on
Your
Laser
Printer!**

JetFax/Windows software works with the JetFax II to provide easy yet powerful Windows faxing.

- **Printer-based.** Fax functions are performed externally. No internal fax boards.
- **Network Windows faxing.** JetFax/Windows supports network faxing, too!
- **Plain Paper Quality.** Faxes are received on your laser printer on plain paper.

CALL TODAY:
1-800-7JETFAX
(415) 324-0600

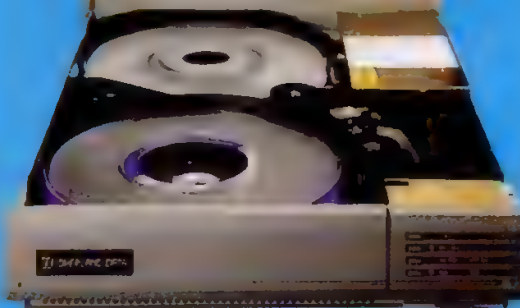
JetFax II

CIRCLE 1063 ON READER SERVICE CARD

**PC 9-Track
& 3480**

- ✓ Widest choice of solutions
- ✓ Modern desktop subsystems
- ✓ Plug-and-play, easy to use
- ✓ Comprehensive software
- ✓ Excellent service and support

Call now for more information
and a free catalog.



**800-729-8725
OVERLAND DATA**

Phone (619) 571-5555 Fax (619) 571-0982

CIRCLE 1066 ON READER SERVICE CARD

**9 TRACK
MAGNETIC
TAPE SYSTEM**

**FOR IBM PC/XT
286/386/486**

- Mainframe to PC Data Transfer
- Data Transfer & Backup to 24 MB/min
- DOS, UNIX Software, Complete System
- Service and Support, Easy Installation
- SCSI Bus Interface Compatible
- 3480 Tape Cartridge Systems

call (919) 763-8400 or write to:
CONTECH Computer Corp.
4304 Market St. Wilmington, NC 28403



CONTECH

CIRCLE 1064 ON READER SERVICE CARD

**9 TRACK TAPE DRIVES
3480 TAPE DRIVES
FOR PC/XT/AT/386/486/PS2**

**LOWEST
PRICES
BEST
QUALITY**



LAGUNA DATA SYSTEMS

23151 Alcalde Drive
Suite B-3
Laguna Hills, CA 92653

(800) 886-4827
714-586-3010 TEL.
714-586-5538 FAX

CIRCLE 1067 ON READER SERVICE CARD

3480 - 9TRACK
FOR PCS AND WORKSTATIONS
DOS • SUN • MAC • UNIX • XENIX • RS/6000

*** TAPE DRIVE SALES & RENTALS**

MANUAL/AUTOLOAD DRIVES 50/125 IPS
SCSI/PERTEC 800/1600/3200/6250

GSA SCHEDULE

*** CONVERSION SERVICES**
*** TAPE DUPLICATOR SYSTEMS**

1-800-362-6250

FAX: 301-309-8355
Rockville, Md

**INTERFACE
SYSTEMS
INC.**

"Real People with Working Solutions"

CIRCLE 1065 ON READER SERVICE CARD

**Featuring
QUICKTAPE™**

- PC/Mainframe Information Exchange
- Transfer Conversion and Duplication
- EBCDIC ↔ ASCII Data Manipulation
- AS-400, TK50, SYS36 and QIC
- Formats Also Available
- UNIX Tar and DEC Save Set Options
- Reseller Inquiries Invited

**READ/WRITE 9-TRACK
3480 • 8MM • DAT on
YOUR PC NOW!**

Call Us ...

1-800-248-3475

**SHAFFSTALL
CORPORATION**
FAX (317) 842-8294

Media Conversion Systems Since 1973

CIRCLE 1068 ON READER SERVICE CARD

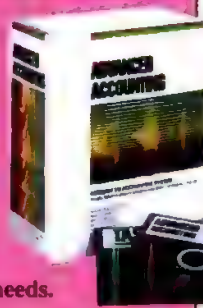
Advanced Accounting™ versus DacEasy® and Peachtree Complete® III

SPECIAL OFFER
\$99
MONEY BACK GUARANTEE

Saves Money

At no extra charge, you get the TAS Professional™ full-featured database/language, multiuser/LAN capability, and the source code for the accounting modules. So you can modify the program to fit your business needs.

Advanced Accounting is available for IBM PC/XT/AT and compatible computers.



COMPARE	DacEasy V4.2	Peachtree Complete III V5.0	Advanced Accounting
Full price including Payroll, G/L, A/R, A/P, Sales Order/Invoicing/ P.O./ Inventory & Tutorial	\$199.00	\$199.00	\$440.00 SPECIAL OFFER \$99
Written using 4th generation language	NO	NO	YES
Source code included/modifiable	NO	NO	YES
Easy-to-change file structures	NO	NO	YES
Report generator included	YES	NO	YES
Multiuser/LAN option included	NO	NO	YES
Real time postings	NO	NO	YES
3-years GL data by month active	NO	NO	YES
Bank account reconciliation	YES	\$79.00	YES

Advanced Accounting does it all. All modules are fully integrated, you only need to enter data once. A few of its features are:

- General Ledger** Full audit trails
 - Post previous periods
 - Auto recurring transactions
- A/R-Invoicing/Sales Order**
 - Open item/balance forward
 - Mailing labels
 - Flexible aging
 - Backorders
 - Tax & discount by line
 - Complete history

A/P-Purchase Order Flexible choose to pay • 1099 reports • Hand-computer generated checks • Multiple receipts • Complete history

Inventory Sell fractional quantity • Regular & "non-inventory" items • Detailed history of sales & purchases • Individual sales/ COGS accounts

Payroll Automatic taxes • Multi-state payrolls • W-2 & quarterlies

Special Offer—Limited Time

Trade up to Advanced Accounting today and save \$50! Call us with the serial number of any accounting software package or mail us a copy of the manual title page and we'll take \$50.00 off the suggested retail price of \$149.00. A fantastic deal.

Please add \$8 for shipping/handling.

Money Back Guarantee

Try Advanced Accounting for 60 days. If it isn't the answer to your accounting software needs send it back for a full refund. (less a \$10 handling fee)

Order Today!

1-800-648-6258

• VISA, MasterCard, and COD accepted
BUSINESS TOOLS, INC. 104 S. Estes Dr.
Suite 101
BUSINESS TOOLS Chapel Hill
SOFTWARE NC 27514

Advanced Accounting is a trademark of Business Tools, Inc. IBM PC/XT/AT are trademarks of International Business Machines. DacEasy is a registered trademark and DacEasy Accounting is a trademark of DacEasy, Inc. Peachtree Complete III and Peachtree are registered trademarks of Peachtree Software Inc.

Raster-to-Vector Conversion Software

Scan into CAD and most other drawing programs!

Before ENVISION IT
Conversion:
TIFF (raster file)



After ENVISION IT
Conversion:
DXF (vector file)



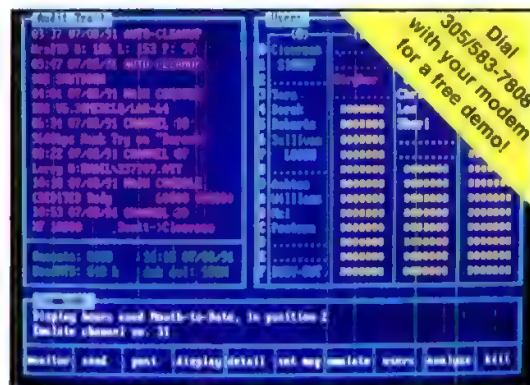
1-800-321-3689

30-Day, 100% Money Back Guarantee!

\$299 ENVISION IT Software Version 2.0

\$399 ENVISION IT with ENV64—Envisions' 400 dpi hand-held scanner. Total retail value \$498.

"Bulletin boards become a major means of communication"—Wall Street Journal



Lots of users (up to 256 at the same time), from all over the world or all around your office, can call into The Major BBS' using modems, your Novell LAN, or X.25 networks such as CompuServe. With a single PC AT, PS/2, 386, 486 or compatible, using DOS 3.1 or later, you can provide:

- E-mail & file transfers
- Public message areas
- Modem server features
- Teleconferencing
- Online order entry
- Multi-user databases
- Polls & questionnaires
- ...24 hrs/day, 7 days/week!

Call 305/583-5990 or fax 305/583-7846

GALACTICOMM

Free DOS Tips.

Call Toll Free
1-800-223-8720 Ext. 726

* from The Cobb Group's newsletter
Inside DOS.

E-Mail Anywhere!



BACKMAIL

PC-to-PC communication just got easier! BackMail lets you create an E-Mail net using ordinary phone lines. A 33K TSR, BackMail works great for on-the-go computer users. For communicating with remote sites, multiple retail or plant operations, or just sending info to the next office, BackMail can't be beat. There's even a companion product, BackMail II HUB, for setting up a Computerized Post Office for hundreds of users. During our limited offer, get two copies and manuals for just \$129.00. Order yours today!

1-800-333-7582 Voice 1-800-678-9850 FAX/BackMail



BMU ²SOFTWORKS
A Sign of Intelligent Software

2457 Perkiomen Avenue, Reading, PA 19606

CIRCLE 1069 ON READER SERVICE CARD

How the HECK can VP-Info OUTperform \$795 database languages for only \$189?

We can do it because we're small, hungry, lean and mean. And we mean business. But don't just take our word for it—check out the rave review on VP-Info Professional in the May 28/91 PC Magazine cover story on Relational Databases. Or write/fax us for your free reprint. Now, how the heck can you beat that?



VP-Info
PROFESSIONAL™

\$189 Single-User \$369 Network

1313 5th St. SE Minneapolis, MN 55414
1-800-55-INFO5 or 612-379-3898

Buy Direct & Save! Satisfaction guaranteed or money back!

CIRCLE 1070 ON READER SERVICE CARD

Professional CLIP ART GALLERY

- ✓ Over 1000 Images!
- ✓ Incredible Detail!
- ✓ So Easy To Use!

CALL FOR FREE CATALOG

OR Try a Sample of 90 Images for only \$9.95 + \$3.00 s&h
SoftAge Publishing 1753-C E. Palmdale Blvd., Suite #433, Palmdale, CA 93550
800-736-7103 24 Hr. FAX 800-869-1434
Outside U.S. 805-945-0051 805-723-7156

CIRCLE 1071 ON READER SERVICE CARD

EXPLORE OUTER SPACE

ORBITS

Voyage Through the Solar System.

Journey through the solar system with colorful animation, 3-D graphics and actual satellite photos.

SPECIAL \$47



AND INNER SPACE.

BODYWORKS

An Adventure in Anatomy.

Comprehensive, full-color computer graphics lead you on a fantastic voyage into the systems, structures and functions of the human body.

SPECIAL \$62



Compuclassics
YOUR SOURCE FOR SOFTWARE

1-800-735-1993 toll-free 7 a.m.-6 p.m. PST
or FAX 818-347-9977 24 hours a day

CIRCLE 1072 ON READER SERVICE CARD

EARN YOUR COLLEGE DEGREE AT HOME

B.S. & M.S. In Computer Science

Get the opportunity and earning power a college degree confers—without leaving home and without spending thousands of dollars.

- Approved for tuition reimbursement by leading corporations
- ALL COURSES BY CORRESPONDENCE
- Most courses interactive
- Approved Ada course available
- Qualified instructors available on telephone help lines

AMERICAN
INSTITUTE
OF
COMPUTER
SCIENCES

Phone: 1-205-323-6191 • FAX: 1-205-328-2229
2101 PCX Magnolia Ave. • Suite 200 • B'ham, AL 35205

Loan Amortization Software

A favorite of banks & atty's worldwide!

Over 6000 sold!



- ✓ Easy Amortization Schedules
- ✓ Replace Financial Calculators
- ✓ Change variables instantly

Exec-Amort™ \$149.95
Mini-Amort™ \$79.95
5 user Network Version: \$450.00

Order Today Call 800-344-8448

CIRCLE 1073 ON READER SERVICE CARD

ANNOUNCING



Version 7.0

- Full Color Support
- Network Support
- Global search & replace
- 3D Charting
- Over 270 output devices supported

DON'T buy any flowcharting product until you test drive EasyFlow. Unprecedented support for Desktop Publishing & Graphics packages, Alternate Shape Libraries, FREE tech support and a NO RISK 30 Day Money Back Guarantee all combine to make EasyFlow the industry leader and corporate standard.

Vendor Direct List Price

\$280

Plus Shipping

HavenTree Software Limited
P.O. Box 1093-P
Thousand Island Park, NY 13692
Telephone: (613) 544-6035 Ext.49
Fax: (613) 544-9632



ORDER HOTLINE 1-800-267-0668

CIRCLE 1077 ON READER SERVICE CARD

ANNOUNCING Computer Select™

The Most Complete
Database of
Computer Product
Information Available



With COMPUTER SELECT you'll never again risk making the costly mistake of acquiring the wrong product. Now, using your own PC, you can identify, evaluate and select the best products that meet your requirements and your budget. Easy-to-use search software lets you quickly retrieve the documents you need from the vast database of product reviews, specifications, announcements and buyer's guides.

Discover the power of this new CD-ROM product. Call now for your free, no-obligation demo disk. Then, if you wish, you can subscribe for \$995.*

Get instant access to more than...

- 70,000 articles and abstracts each month
- Complete specs for 70,000 hardware, software and communications products
- Profiles of 12,000 companies, including addresses and phone numbers
- 9,000 definitions of computer and telecommunications terms.

COMPUTER
LIBRARY

One Park Avenue, New York, NY 10006

CALL NOW FOR A FREE
DEMONSTRATION DISK
212-503-4400

Computer Library and Computer Select are trademarks and Data Sources is a registered trademark of ZM Communications Company. ©1991 ZM Communications Company

*U.S. and Canada only. Outside U.S. \$1195

Super VGA Computer Images

Also VGA/EGA/CGA/Mono and Animation

1024x768x256

Photographic Quality And Color Images

BBS

1-800-GO-MODEM

Toll-Free Lines

Exclusive from Event Horizons, 50,000 top quality, state of the art color MaxiPic GIF images and Sound VGA Movies, all categories, ratings, resolutions.

BBS 800-GO-MODEM,
or BBS 503 697-5100. \$12/hr.
Toll-Free lines \$8/hr extra

No Modem? Order our Mail
Image Library with Samples
for \$9. World-wide shipment.
Info voice line 503-697-7700.
Credit cards accepted.
Same day shipment anywhere.

Event Horizons
311 Ave B, Suite 209
Lake Oswego, OR 97034
Information: 503-697-7700



CIRCLE 1078 ON READER SERVICE CARD



COLOR PRINTS VIDEO • 4x5's OVERHEADS SCANNING

Vibrant, high-resolution output from
your computer files using the Canon CLC500
Color Laser Printer and other high-quality imaging devices.

Call for free User Kit
and free trial information.

800-433-8829
703-343-8243 • Fax: 703-343-0691



IMAGE
CENTER

CIRCLE 1079 ON READER SERVICE CARD

Graphic™

Publication Quality Scientific Graphics

- Linear, log, polar plots
- Shaded contour & 3-D plots
- Export PIC, GEM, HPGL, TIFF files
- Source code for full control
- 23 fonts, 16 symbols, 9 linestyles
- Simultaneous plots
- Color PostScript™ EPS
- High-resolution Tektronix® format
- Supports most printers, plotters and graphics cards
- 286 Extender version available

Licensed for personal use only

*All of the C language routines you need to write an impressive scientific graphing program of your own. Highly Recommended

PC Magazine

508 North Kentucky St.
Kingston, TN 37763

CIRCLE 1080 ON READER SERVICE CARD

Sending Your Computer to Medical School Helps You Stay Healthy!

Is that indigestion ... or a heart attack? **Doctor Schueler's Home Medical Advisor** gives you an enormous amount of accurate medical information with a few keystrokes. Developed by Board Certified Emergency Physicians and currently used in doctors' offices.

The **Symptom File's** question and answer format generates over 600 illustrations and 450 diagnoses.

The **Disease File** gives info about the symptoms and treatment of over 450 diseases. Know EXACTLY which specialist treats your problem.

Learn how to treat over 130 injuries with the **Injury File**, everything from frostbite to ankle sprains.

Identify and learn the side effects of over 800 prescription and over-the-counter drugs with the **Drug File**.

Included are a **Test File** of medical tests and a **Poison File** listing household ingestions — great for mothers with toddlers. Registered users will be eligible for updates at a cost of five dollars, so YOUR medical encyclopedia NEVER goes out of date. Call now. This indispensable reference tool prints medical information for family and friends and makes learning FUN!

Manufacturer's suggested price: \$99.95

Introductory offer: **\$69.95** 512K RAM EGA/VGA

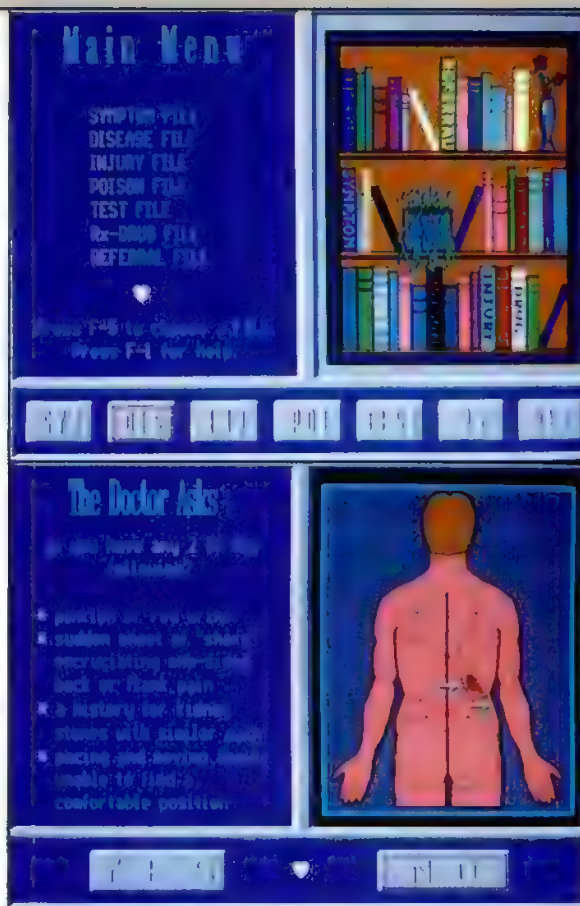
FREE Same Day Shipping!

IBM & Compat.

See your software dealer or call **1-800-788-2099**

PIXEL PERFECT, INC.

10460 S. Tropical Tr., Merritt Island, FL 32952



CIRCLE 1081 ON READER SERVICE CARD

Music Machine

Turn your PC into a powerful Music Workstation with our full-line of PC MIDI products.

Try our \$19.95 DemoPak and apply the cost when you buy software from us.

Voyetra Dept. PCM
333 5th Ave
Peiham, NY 10803
(914) 738-4500 Fax: 738-6946
Order/Catalog: **1-800-233-9877**



CIRCLE 1082 ON READER SERVICE CARD

COMPLETE BIBLE BOOKSTORE ON DISK!

JUST DIAL

1-800-423-1228

FOR YOUR

Free Catalog!

BIBLE RESEARCH SYSTEMS

2013 WELLS BRANCH PKWY. # 304 • AUSTIN, TEXAS 78728

CIRCLE 1083 ON READER SERVICE CARD

DON'T BE BLUE.

Don't think you can't afford to target over 870,000+ PC buyers here in color. You can.

Call **1-800-825-4237**

SOFTWARE SECURITY
1(800) 456-2587

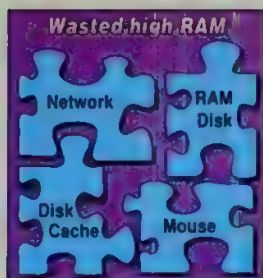
Stop lost profits with SecuriKey — a unique hardware device that prevents unauthorized use of computer software.

- IBM, compatible & Macintosh
- Allows unlimited backup copies
- Does not permit duplication
- Available in custom colors & logos
- UNIX/XENIX/Serial Device



150 Wright Brothers Drive, Suite 560
Salt Lake City, Utah
84116-2847

CIRCLE 1084 ON READER SERVICE CARD



High loading drivers & TSRs like puzzle pieces that never fit

Even if you use QEMM[™], 386MAX[™], DOS 5 or any other memory

manager, your PC has wasted high RAM. How does your PC use that wasted RAM? It doesn't! Unless you have Memory Commander[®] a Memory Commander is the only 386/486 memory manager that recovers the unused high RAM and adds it to low DOS. Memory Commander automatically loads your TSRs and Drivers and optimizes your high RAM. Then the unused high RAM can be added to low DOS significantly increasing the standard 640K. You can add as much as 160K for running VGA graphics programs and 280K for running VGA text programs.

Memory Commander[®]

"What a feeling. I'd installed V Comm's Memory Commander... and was seeing something I had never seen before 792,636 bytes free. Wow!"

BYTE 9/91

"Wow!" "Memory Commander is an innovative product that will be your best choice if you must have a really large memory pool for DOS."

PC MAGAZINE 2/11/92

"Memory Commander from V Comm. takes the ultimate step."

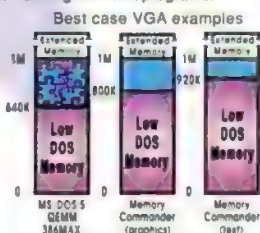
PC Sources 11/91

"my computer now comes on...with the proud message 827,392 total bytes. "What a product! How did I ever live without it?"

U.S. TECH 11/91

Beats QEMM[™]. Guaranteed.

We're convinced Memory Commander is the best. If you don't agree, return it within 60 days of purchase for a no-questions asked full refund



✓ To get more low DOS than with your current memory manager, send FAX its manual's title page. We'll send you Memory Commander for \$49.95.

✓ If you don't have a memory manager and want to start with the best, order Memory Commander for \$99.95

V Communications, Inc.
4320 Stevens Creek Blvd. Suite 275 PC
San Jose, CA 95129 FAX 408-296-4441
800-648-8266 or 408-296-4224
U.S.A. shipping \$6. Can & Mex \$10. Other \$18
CA res. add 7.14% tax. VISA/MC/AMEX
QEMM is a trademark of Qualtronic. Other Systems
386MAX is a trademark of Labnet.com

KeySkin[™] Keyboard Protectors and Dust Covers

From the World's Leader in Computer Protection



Quality - Selection - Service - Fast Delivery

CompuCover Inc.
2104 Lewis Turner Blvd.
Fort Walton Beach, FL 32547

Order Line (800) 874-6391
Service (904) 862-4448
Fax (904) 863-2200

CIRCLE 1085 ON READER SERVICE CARD



LABEL MASTER[™]

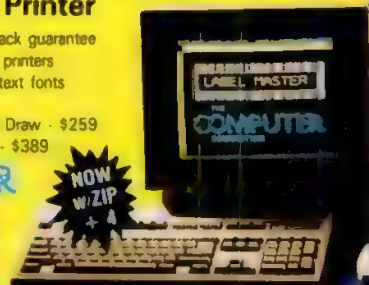
Print Perfect Labels and Forms In-House On Almost Any Printer

- WYSIWYG layout • Money back guarantee
- Supports matrix, laser, thermal printers
- Supports most bar codes and text fonts
- Supports graphics images
- Label Master - \$479 • Quick Draw - \$259
- Developers library with source - \$389

COMPUTER CONNECTION

PO Box 634 • Eau Claire, WI 54702
715/833-2331 • Fax: 715/833-1995

(800) 552-2331



CIRCLE 1086 ON READER SERVICE CARD

WINDOWS OF OPPORTUNITY!

Now you can target the fastest-growing segment of the computer market—the Windows market—with an affordable color ad in the Premier Section of PC Magazine. Not only the biggest computer publication of all time, but the most regularly read publication by PC buyers. Now, PC Magazine Marketplace's Premier—the dazzling color showcase for leading-edge PC products and services—rolls out an exclusive set of display pages only for Windows advertisers.

Place your Windows ad in Premier and open up new opportunities with PC Magazine's 870,000+ PC brand specifiers—by far the lion's share of buyers for the record-breaking 5 million copies of Windows sold in just 18 months.

PC Magazine Premier Windows: the power of four-color advertising in three crisp, attractive ad sizes, just like the rest of Premier. Designed to beautifully showcase your Windows product or service. PC Magazine readers don't go "window-shopping". They come to buy. Be there when they do.

PC MAGAZINE PREMIER WINDOWS.

Call today to reserve your space! 800-825-4237

HARDWARE/ADD-IN-BOARDS

Laptop Memory	
AST-Ex Notebook	IBM - L40SX/135SX
1MB \$72.	2MB \$109.
EVEREX - Tempo	4MB \$189.
2MB \$98.	8MB \$375.
Th-Travelmate 2000	Toshiba - T1000SE/LE/XE
1MB \$98.	T2000SX, T1000LE, T2200-
Sharp - 6220	SC, T2000SX
1MB \$98.	2MB \$155.
HP - 95LX, Page! PC	4MB \$265.
256K \$120.	8MB \$540.
512K \$169.	Toshiba - T1600, T3100E,
1MB \$289.	T3100SX, T3200SX, C,
Compaq	T5100, T5200, C, T6500
LTE 386s/20-1MB	2MB \$105.
4MB \$295.	4MB \$179.
LTE/ute/20.5-2MB	3MB \$175.
4MB \$289.	8MB \$389.
8MB \$625.	
LTE/286	
1MB \$99.	
2MB \$149.	
SLT/286	
1MB \$99.	
4MB \$269.	

Memory Pipeline

"Your Direct Source"



Laser Printer Memory

Hewlett-Packard Laser Jet	IBM Laser 4019 & 4019e
HP, III & IID	2MB \$129.
2MB \$115.	3.5MB \$195.
4MB \$182.	IBM Laser 4029
Hewlett-Packard Laser Jet	All Call
II & IID	Panasonic 4450 & 4420
2MB \$120.	2MB \$130.
4MB \$185.	4MB \$210.
Hewlett-Packard Laser Jet	Canon LP8-4
IIid	2MB Call
1MB \$58.	Canon LP8-4/all
4MB \$175.	2MB \$133.
Hewlett-Packard DeskJet	4MB \$220.
500 & Plus	Epson EP1 6000
256K \$79.	2MB \$138.

IBM Memory

PS/1	2MB \$115.
PS/2 30/244, 1407209	2MB \$99.
PS/2 353X; LS, 405X, 50Z,	1MB \$55.
553X; LS, 653X; LS, 70	2MB \$89.
PS/2 70-A31; A61; B21; B61	4MB \$185.
PS/2 353X; LS, 405X, 553X;	8MB \$410.
LS, 653X; LS, 34F301X	PS/2 553X; LS, 405X
4MB \$185.	8MB \$410.
PS/2 353X; LS, 405X	8MB \$410.
PS/2 80-141	1MB \$62.
PS/2 80-111/311	2MB \$110.

Compaq Memory

DeskPro 386/20, 20E, 26, 3445/14	1MG \$72.
	4MG \$185.
DeskPro 386/30, 3445, 3445X/20	1MG \$59.
	2MG \$95.
	4MG \$185.
DeskPro 386-33, 446-33, 546-33	OKBrd .. \$209.
	2MB \$109.
	8MB \$375.

Memory Pipeline is "Your direct source" for memory upgrades and expansion boards. All our products come with a lifetime warranty and WE WILL NOT BE UNDERSOLD!

Memory Pipeline
4156 Ocean Drive, Oceanside, CA USA 92055
Phone: (619) 994-3653 Fax: (619) 994-5556

24 Hour Fax Ordering
FAX (805) 984-5556

Toll Free Orderline Only/Mon-Fri 8:00-5:00(pst)
(800) 262-7466



Some day shipping by UPS Federal Express or DHL. Order worldwide by PO, COD, APO, RPO & credit card with no surcharge added. 20% restocking fee on all non-defective merchandise.

CIRCLE 601 ON READER SERVICE CARD

MEMORY UPGRADES	
COMPUTERS	FAX MODEMS
APPLE, AST, AT&T, COMPAQ, DATA GENERAL, DEC, EPSON, EVEREX, IBM, HEWLETT PACKARD, NEC, PANASONIC, SILICON GRAPHICS, SHARP, SUN, TEXAS INSTRUMENTS, TOSHIBA, ZENITH	COMPAQ MAXFAX9624L-T-C 9600bps/2400bps/Group III IBM & Compatible MAXFAX9624 9600bps/2400bps/Group III MAXLITE/PC (Portable) 9600bps/2400bps/Group III
NOTEBOOK MEMORY	TOSHIBA MAXFAX9624L-T 9600bps/2400bps/Group III
COMPAQ, TOSHIBA, ZENITH	PRINTER MEMORY
SIMMS SIPPS	Apple, Canon, Epson, HP, IBM, Okidata, Panasonic,....
1MB x 8, 4MB x 8, 70ns & 80ns 1MB x 9, 4MB x 9, 70ns & 80ns	

ADD-ON AMERICA
A DIVISION OF BOWEN COMMUNICATIONS

ROBOFAX SHOPPING MALL
Open 24 hours
Call 800-424-3299
Have your fax # ready. Follow voice instructions.

Toll Free 800-292-7771
433 N. Mathilda Avenue, Sunnyvale, CA 94086
TEL (408) 746-1590 FAX (408) 746-1593

ROMDISK™

High Performance Multimegabyte Disk Emulators
NEW MODELS / LOWER PRICES

- Floppy Drive and multimegabyte emulators for ISA bus computers
- 180K to 14 MB capacities
- EPROM, Flash or SRAM technologies
- Autobooting, Single or Dual disk emulation under PC or MS DOS
- List prices from \$195

CURTIS, INC.
2827 No. Fairview Ave. • St. Paul, MN 55113
612/631-9512 FAX 612/631-9508
PC DOS is a trademark of IBM, MS DOS is a trademark of Microsoft

CIRCLE 602 ON READER SERVICE CARD

CD-ROM

Visual Fantasies On CD-ROM!!!

450 + Megs of the Hottest Adult Graphics Anywhere!

- Enjoy the Best & Own the Most...
- Over 2,500 640x480x256 & Up Files.
- View the Ultimate Slide Show.
- Sizzling Photo-Quality Scenes!!!

Only 99.95 *****

CD ROM Software Specials!

Street Atlas USA	89	KGB World Facts	99
CTA World Facts	79	USA Wars: WW II	99
Terrorist Groups	99	Lang-er World	295
Toolwks Ref Lib	99	N. Am. Fax Book	199
Game Pack II	67	RBBs in a Box	97
Family Doctor	79	Total Baseball	68

FREE Disc Caddy w/Orders Over \$100*

MC/VISA/AMEX, Cx/MO 24 hrs/7 days Add \$3.99
PC CompNet, Inc. 2080 Emery Ave., Suite 216
La Habra, CA 90631 Info: (310) 943-9878
FAX: (310) 947-1131

*12.95 Value. Minimum Order Amount. Does Not Include SH. Prices & Availability Subject to Change Without Notice.

(800) 524-3811

CIRCLE 603 ON READER SERVICE CARD

COMPUTER SYSTEMS

486-50 MHz CACHE

Since 1985, MSE has been dedicated to bringing you high-quality American designed, engineered and built computer systems for a wide range of applications. NOW, for our 7th year anniversary special, we are proud to introduce our fastest and most powerful machine, the 80486-50MHz or 33MHz.

MicroCache 386-33MHz \$1095

- 80386-33MHz CPU
- 125MB Fast Dr. (15ms)
- Enhanced Keyboard
- 385-33MHz CACHE Controller
- 1.2MB Floppy Dr.
- 64K Cache
- 2 Serial/Parallel
- 40MHz Add \$50

MicroCache 486-33MHz

- 80486-33CPU 4MB RAM
- 1.2MB Floppy Dr
- 210MB Fast Dr. (15ms)
- 64K Cache
- Enhanced Keyboard
- 50MHz add \$300

\$1595

MicroCache 486 EISA-33MHz

- Intel Chip Set, 4MB RAM
- 1.2MB Floppy Dr
- 340MB Hard Disk Dr. (13ms)
- 128K Cache, expandable to 256K
- Enhanced Keyboard
- 50MHz Add \$500

\$2595

Motherboard Special

- 386SX-16MHz W/1MB RAM \$299
- 386SX-25MHz W/2MB RAM \$399
- 386-33MHz W/4K Cache/4MB RAM \$499
- 486-33MHz W/4K Cache/4MB RAM \$799
- 486-50MHz W/4K Cache/4MB RAM \$1099
- 486 EISA-33MHz W/128K Cache/4MB RAM \$1399
- 486 EISA-50MHz W/128K Cache/4MB RAM \$1899

Expansion Options

- Nano 9080 i Monitor 16" \$1049
- ATI Graphics Ultra \$499
- Sony 1304 HG Monitor 14" \$579
- Novell NE 1000 Kit \$129
- SVGA (1024 x 768) Monitor 14" \$299
- TSVGA Card (1024 x 768) 1 MB \$99
- Orchid Pro Designer II 1MB \$199
- NEC/Seiko/Hitachi 20" Monitor \$999
- FTI Caching Disk Controller (0.3ms) W/512K RAM \$299

SALES HOURS:
Monday - Friday
9:00 AM - 5:30 PM
Saturday
10:00 AM - 3:00 PM
PST

MS ENGINEERING, INC.
10601 S. De Anza Blvd., Suite 214
Cupertino, CA 95014
(408) 257-4249 FAX: (408) 257-4398

CIRCLE 604 ON READER SERVICE CARD

ONE MAGAZINE DELIVERS THE BIGGEST MARKET OF PC BUYERS: PC MAGAZINE

870,000+

DISKETTES

BASF		SONY		DYSAN	
  		1/4" Tape		  	
5 1/4" DS/DD	37¢	2000	\$12.60	3 1/2" DS/DD	49¢
Formatted	41¢	2120	16.00	Formatted	64¢
5 1/4" DS/HD	51¢	6150	17.60	3 1/2" DS/HD	76¢
Formatted	78¢	4mm (1.3Gb)	13.50	Formatted	\$1.03

Lifetime Warranty

Provides 300% for Price/Tape 10/lot. Mix & Match any format/sizes

P.O. Accepted ▲ \$3 Handling Fee/Order + Freight

Prices Subject to Change Without Notice

FAK (800) 462-5656 ▲ Freehold NJ 07728



(800) 222-0490



CIRCLE 610 ON READER SERVICE CARD

BUY A BETTER BULK DISKETTE			
NAME BRAND BULK			
VERBATIM	5.25 DS/DD	100 QTY.	.28¢
	5.25 HD		.52¢
SONY	3.5 DS/DD		.50¢
	3.5 HD		\$1.09
GENERIC	5.25 DS/DD	100 QTY.	.24¢
	5.25 HD		.38¢
100% GUARANTEED	3.5 DS/DD		.39¢
	3.5 HD		.79¢
800-356-2553			
media source™			
FAX (404) 952-1432			

CIRCLE 612 ON READER SERVICE CARD

6505 Cecilia Circle, Minneapolis, MN 55439
1-800-289-6561
 (CIRCLE 609 ON READER SERVICE CARD)

The logo for PC Magazine, featuring the letters "PC" in a large, bold, sans-serif font above the word "MAGAZINE" in a smaller, all-caps, sans-serif font, all contained within a rectangular border.

F A

Get 5

**Get The Best Out Of
Your Product Has Been Chosen
EDITORS' CHOICE.**

**Let us take your article to its highest level of marketing
potential with a reprint!**

To find out how you can have your article or review elegantly
reprinted** on 80 lb. paper stock, in 4-color, 2-color or 1-color, call
or write today: Claudia Crichlow—Reprints Manager; Ziff-Davis
Publishing Company, One Park Avenue, New York, NY 10016,
212-503-5447.

**** Minimum quantity 500 reprints.**

PC CLASSIFIED

DISKETTES

Verbatim

3.5 Double Side..... 7.19
3.5 DS IBM Format..... 7.60
3.5 High Density..... 11.99
3.5 HD IBM Format... 12.90
5.25 HD IBM Format.. 8.69
5.25 HD Datallife Plus. 8.95
DC-600A..17.35
DC-6150..18.25
DC-2120..16.30
Call for other Verbatim products

Canon

BJ-10ex

BUBBLE JET PRINTER

The NEW BJ-10ex can print your documents on a variety of neat materials like transparencies, bond paper, company letterhead & even envelopes.

CALL FOR BEST PRICE

SONY

CD ROM (EXTERNAL)

Laser Library

Model 7205

Complete with Drive, Interface Card & Cable, Stereo Headphones CD Caddy & 6 ea. CD-ROM Software Discs
CALL FOR BEST PRICE

hp HEWLETT PACKARD

HP #92295A
LaserJet II
LaserJet IID
LaserJet III

73.95 ea.



HP #92275A
LaserJet IIP
LaserJet IIIP

61.95 ea.

NEW GENUINE HP

Dysan

FREE Plastic Box
IBM Pre-Formatted!

5.25" DS.... 4.69
5.25" HD.... 7.89
3.50" DS.... 6.29
3.50" HD.... 11.69

3M

DISKETTES

3.5" Double Side..... 7.19
3.5" High Density.... 11.99
3.5" HD IBM Format 12.75
5.25" Double Side..... 4.99
5.25" High Density.... 8.69
5.25" HD IBM Format 9.39

DATA CARTRIDGES

DC 2000.. 13.95 DC 2120.. 18.95
DC 600A.. 19.95 DC 6150.. 21.50

AUTHORIZED DISTRIBUTOR DATA STORAGE PRODUCTS

SONY

3.5" Double Side. 7.19

3.5" High Density 11.99

(Standard 10 Pack Box)

BULK (NO-LOGO)

3.5" DS - .49

3.5" HD - .89

8MM & 4MM Data Tapes
Data Cartridges

maxell
FLOPPY DISKS

3.5" Double Side.... 7.19

3.5" High Density.. 11.99

5.25" Double Side.. 4.89

5.25" High Density. 8.59

IBM Pre-formatted "CALL"

Data Cartridges

Optical Disks

8MM & 4MM Data Tapes

HEAD CLEANERS

DISKETTE CONNECTION

EAST 1-800-451-1849

MIDWEST 1-800-654-4058

WEST, HI & AK 1-800-621-6221

FAX (405) 495-4598

Min. Order \$20.00 - NO SURCHARGE on VISA / MC - COD orders add \$4.00

Shipping charges by item & delivery required - Prices subject to change without notice

CIRCLE 613 ON READER SERVICE CARD

Did you know...

PC Magazine Classified generated a whopping \$200 million in sales revenue for its advertisers, resulting in these expenditures—

- Over \$52 million in applications software
- Over \$52 million in computer systems
- Over \$22 million in supplies
- Over \$12 million in systems
- Over \$61 million in peripherals
- Over \$500,000 in consulting services
- Over \$8.9 million in other computer products and services

Get all the facts. Call your PC Magazine Marketplace Account Representative for more information or to place your ad, 212-503-5115 or 800-825-4237.

EXPANSION UNITS

ICs PROMPT DELIVERY!!!
SAME DAY SHIPPING GUARANTEED

Memory for almost ALL computers			
DYNAMIC RAM			
4M Board for hp LJ's w/2MB			\$125.00
SIMM 4Mx9	70 ns		150.00
SIMM 1Mx9	80 ns		49.00
SIMM 1Mx9	80 ns		42.50
4 Mbit 4Mx1	80 ns		25.00
1 Mbit 1Mx1	80 ns		28.00
1 Mbit 1Mx1	70 ns		4.70
41256 256Kx1	80 ns		1.85
41256 256Kx1	100 ns		1.70
44256 256Kx4	80 ns		5.25
4464 64Kx4	100 ns		1.50
EPROM			
27C4001 512Kx8	150 ns		\$28.00
D28F010 128Kx8	150 ns		24.00
27C1000 128Kx8	200 ns		6.30
27C512 64Kx8	120 ns		4.75
27128 16Kx8	250 ns		3.40
STATIC RAM			
1 Mbit 128Kx8	Real		\$21.50
62256LP 32Kx8	100 ns		5.60

OPEN 5 1/2 DAYS, 7:30 AM - 5 PM SHIP VIA FED-EX ON SAT

SAT DEL ON MON
REC'D BY TUESDAY
MICROPROCESSORS UNLIMITED INC.
1000 N. 10TH ST. SUITE 100
DALLAS, TX 75207
(918) 267-4961

CIRCLE 614 ON READER SERVICE CARD

Classified Advertising
Information
(800) 825-4237

EXPANSION UNITS

ACCOUNTING

30-DAY MONEY BACK
GUARANTEE
Compatibility 100%
GUARANTEED

MEMORY

INFINITY
MEMORY PRODUCTS & UPGRADES

"Your PC Magazine Memory Source
for 4 years!"

VISA

MasterCard

COD

DRAMS

100NS	80NS	70NS
1MB X 1: \$4.25	\$4.45	\$4.55
256K X 4: 5.05	5.25	
256K X 1: 1.50	1.60	1.95
64K X 4: 1.70	1.95	

*Call for prices on 60NS DRAM

IBM TYPE SIMMS/SIPPS

80NS	70NS	60NS
4MEG X 9: \$145	\$149	\$175
1MEG X 9: 41	45	48
256K X 9: 14	15	19

*Please add \$2 for SIPPS

72-PIN/SIMMS

1MB X 36-80NS(4MB)	\$195
--------------------	-------

MATH COPROCESSORS

	INTEL	CYRIX
80287/XL	\$95	\$85
80387/SX-10	\$125	\$115
80387/SX-20	\$135	\$125
80387/DX-20	\$199	\$175
80387/DX-33	\$199	\$179

PS/2 UPGRADES

30/286	512K/2 MB KIT	\$29/105
502/55SX, 65SX, 70-E61/061/121	1/2 MB	\$55/05
70-A21/A61, 70-B21/B61	2 MB	\$105
55SX/LS, 65SX, 70 & 80 EXP BRD	4 MB	\$179
80-111/311	2 MB	\$125
80-A21/A31/A61	4 MB	\$235
90: 95, P75	2/4 MB	\$115/195
EXP BRD, 50:502, 60: 55SX, 65SX	2-8 MB w/2 MB	\$259
EXP BRD: All Models 70 & 80	2-14 MB w/2 MB	\$375
	4-16 MB w/2 MB	\$399

PS/1 UPGRADES

512K/2 MB	\$45/109
PS/2 140SX/N33SX	
2.4/8 MB	\$105/205/399

LAPTOP UPGRADES

COMPAQ	LTE 286	
	1/2 MB	\$79/115/209
	LTE 386S/20	
	1/4 MB	\$145/345
	SLT 286	
	1/4 MB	\$119/395
	SLT 386S/20	
	1/2 MB	\$125/175/299
TOSHIBA	1000LE, 2000SX/SXC	
	2/4 MB	\$175/305/549
	1200XE, 1800, 3100E	
	2 MB	\$105
	2000SX/2000SXC	
	2/4 MB	\$195/295/549
	3100SX, 3200SX	
	2/4 MB	\$105/175
	3200SXC	
	2/4 MB	\$109/195
	AST EXECUTIVE	\$ LOWEST
	EVEREX TEMPO	\$ LOWEST
	TI TRAVELMATE	\$ LOWEST

DESKTOP UPGRADES

COMPAQ DESKPRO	206E, 385-20/23E, 25/25E	
	1/4 MB	\$75/185
	385S/16 1/4 MB	\$75/189
	385-20E/25E, 385S/16	
	1-9 MB EXP BRD	\$255
	4-12 MB EXP BRD	\$255
	286N, 386M, 385SX/20	
	1/4 MB	\$65/195
	385/33L, 486-25/33L: SYS PRO	\$115/395
	2/8 MB	
AST PREMIUM	386C, 386-18	
	1/4 MB	\$69/155
	386/20	
	1/4 MB	\$85/245
PREMIUM 11386SX CUPID-32	2 MB	\$125
	1/4 MB	\$69/219/459
DELL 386 SERIES	1/4 MB	\$ LOWEST
HP VECTRA	1/4 MB	\$ LOWEST
NEC POWERMATE	1/4 MB	\$ LOWEST

LASER PRINTER UPGRADES

HP II, IID, HP, III, IIB, IIP	1/2 MB	\$75/115/195
HP IIi	1/4 MB	\$50/169
PANASONIC 4420, 4450I	1/2 MB	\$85/125/205
IBM 4015, 4019e	1/2 MB	\$85/125/185
IBM 4029	1/2 MB	\$85/125/185
EPSON EPL6000, TOSH GLASER	1/2 MB	\$89/129/209
CANON LBP-4	1/2 MB	\$195/239
TI MICROLASER	1 MB	\$69
DKI 400, NEC	1 MB	\$ LOWEST

TERMS & CONDITIONS

- 30-DAY MONEY-BACK GUARANTEE
- All products one-year warranty
- Price & availability subject to change
- Memory chips not installed on boards
- 15-day restocking fee on non-defective returns & refused orders

INFINITY

Memory Products & Upgrades
633 Post Street, Box #197
San Francisco, CA 94109-8215

"MEMORY HOTLINE"

1(800) 444-7785

(415) 398-2987 Fax: (415) 398-5402

* No Surcharge on VISA/MC

* PO's Accepted from Gov't and
Qualified Firms

* 30-Day Money-Back Guarantee

CIRCLE 615 ON READER SERVICE CARD

MONITORS

PRINTERS

KIMEX Corporation

Color Monitors

- 0.28 SVGA \$ 310
- 0.41 SVGA \$ 249
- 0.51 VGA \$ 219

Buy any Monitor and get

FREE

ATI VGA CARD

1-800-875-8846

V9 & MC Accepted. Tel: 408-452-8846
\$ & Hst included. Fax: 408-452-8857
1 year warranty.

CIRCLE 616 ON READER SERVICE CARD

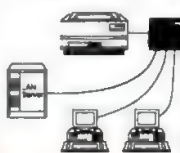
Hassle-Free Printer Sharing

...in a Compact Package!

The JetWay allows up to eight users to whoosh data to their printer at 115,200 baud - for less than \$89 per user!



► 4-port JetWay \$345 ► 8-port JetWay \$345



Just plug your PCs and printer cable into the JetWay and you're ready to print to your laser, dot matrix or other standard parallel printer! 256K - 4MB buffer available.

ASP Computer Products offers a wide variety of innovative printer enhancement and connectivity solutions.

To order your JetWay or for your free catalog call us today
800-445-6190

ASP

160 San Gabriel Drive
Sunnyvale, CA 94086
Facsimile 408-746-2803

CIRCLE 618 ON READER SERVICE CARD

COMMUNICATIONS/ NETWORKING

MULTI-LINE PC-DOS BBS

The Bread Board System (TBBS). Secure reliable, full-featured commercial information system for IBM and compatibles. Menu editor allows customization by nonprogrammers. Kermit, X, Y & Z-Modem. High performance allows up to 64 simultaneous callers. Up to 38,400bps dBASE module available.
eSoft, Inc.
15200 E. Girard Ave. #2550
Aurora, CO 80014
(303) 699-6555

Did you know...

PC Magazine is exclusively read by over 870,000+ business buyers and brand specifiers, including computer resellers and consultants.

TAPE DRIVE SUBSYSTEMS

TAPE SUBSYSTEMS

9 Track, 1/4 inch, 4 mm, 8 mm, 3480 compatible
PC/AT/386/486/PS/2, CLONES, SUN, MAC, MVAX
Call the tape subsystem experts • Our Advice Is FREE

Tara Computer Products, Inc.

2219 E. Thousand Oaks Blvd. #102, Thousand Oaks, CA 91362
(800) 543-7403 (805) 375-8608
Fax# (805) 375-8610

CIRCLE 617 ON READER SERVICE CARD

SOFTWARE/ ACCOUNTING

MIP Fund Accounting System

Simply the best software for non-profit & governmental organizations since 1982.

Flexible Chart of Accounts • Automatic Offset & Interfund Balancing • Automatic Cost Allocations • Monthly Budgeting & Forecasting • Check, P.O., & A/R Bill Printing • Multiple Funds • Multiple Overlapping Fiscal Years • User Defined Reports • IBM PC/XT/AT Compatible • Single User or Network • User Installable

Modules: General Ledger, Budget Reporting, Accounts Payable, Encumbrances, Accounts Receivable, Database Interface, Payroll, Fixed Assets

1-800-647-3863

505 East Huntland Drive, Suite 340, Austin, TX 78752

To place your ad in
PC MAGAZINE CLASSIFIED

Call (212) 503-5115 or (800) 825-4237

DATA ENTRY

Front-End to Host Applications

- End-user data entry
- Replaces key-to-disk systems
- Menu-driven edit selection
- Easy form design
- International distributors
- Toll-free support hotline

ENTRYPOINT

DATALEX 800-962-8888

CIRCLE 626 ON READER SERVICE CARD

415 362 4466 FAX 415 362 5733
From Canada 800 848 5548

DATA ENTRY

Why have over 85% of the largest companies in the U.S. selected the RODE/PC Data Entry System?

The answer will be obvious when you call for information and a free demonstration today.
(415) 323-8195



DPX • 490 California Avenue
Palo Alto CA 94306

CIRCLE 621 ON READER SERVICE CARD

DATA ENTRY SOFTWARE

HEADS-DOWN data entry and TWO-PASS verification. Fast and powerful, of course, but more importantly, extremely easy to use. Paint the screen formatting in minutes. On-line help text, edit language, batch control.

PC from \$395
Also for LAN's,
IBM AS/400™,
IBM S/36

FREE Trial

206/776-6443
800/356-0203



COMPUTER KEYES
21920 Makah Rd.
Woodway, WA 98020

VIKING DATE ENTRY

Professional Quality Software

- Used by U.S. Census
 - Advanced validation
 - Sequential/ISAM files
 - MS/DOS, UNIX, XENIX, VMS, AIX
 - Technical support
 - Re-key verify
- Viking Software Services
4808 E. 67th St., Ste 100
Tulsa, OK 74136
918/491-6144 FAX: 918/494-2701

ENGINEERING

SIMULATION

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. Specifically designed for interactive use on today's high-speed microprocessors, it is loaded with features such as interactive graphics and animation. Using GPSS/PC, you can predict the behavior of complicated real world systems.

MINUTEMAN SOFTWARE
P.O. Box 171/B
Stow, MA 01775
800-223-1430/508-897-5662 Ext. 316

Replace dedicated data input systems
Front-end mainframe applications

KeyEntry III

- ✓ LAN or stand-alone environments
- ✓ ScreenPainter and MenuManager included
- ✓ Batch Control System and Reformat utility
- ✓ Spanish, German, and French versions
- ✓ Outstanding customer support
- ✓ Thousands of users worldwide
- ✓ OS/2 version

800-533-6879

FREE DEMO DISK
AVAILABLE TO
QUALIFIED COMPANIES



SOUTHERN COMPUTER SYSTEMS, INC.
(205) 251-2985 • FAX (205) 322-4851
In UK: SCS Europe, Ltd. 0753-36550/FAX 0753-36765

ENTERTAINMENT/GAMES

BLACKJACK COMPUTER



The ultimate card-counting weapon, operated under complete concealment within the casinos. CPU, "magic" shoes, I/O switches, sensors, power supplies. Complete training and support provided. Win consistently with the latest generation of the technology every casino fears the most.

Contact
(714) 865-1191

Calling about an ad?
Say you saw it in

**PC Magazine
Classified**

ENTERTAINMENT/GAMES



SeXXy Software

Must State
Age Over 21

CONNOISSEUR COLLECTION

ALL NEW! In 256 Color VGA!!

SeXXy Disk #1 • An unbelievable visual encounter - MUST SEE!! **BONUS** 2nd movie ADDED

SeXXy Disk #2 • 3 Erotic encounter games for friends and lovers guaranteed to shed both clothes and inhibitions.

SeXXy Disk #3 - NEW! Try to score in over 150 Romantic Encounters - adventure game.

SeXXy Disk #4 - NEW! Watch Ginger in this incredible 9 minute movie.

SeXXy Disk #5 - NEW VERSION! Create your own erotic fantasies about friends & lovers.

SeXXy Disk #6 • View, print or edit ten sizing pictures including celebrities

\$7 each, any 3 for \$17, or all 6 for \$32. For IBM & compat. VGA, EGA or VGA graphics req'd

SeXXy Disk #CC1 • ★ YOU BE THE STAR ★ The FIRST CUSTOMIZABLE movie allows you to write the dialog and the title. You can star with the partner of your choice. Incredible scenes display with your dialog. ONLY AVAILABLE FROM US!

SeXXy Disk #CC2 • THE FIRST SOUND MOVIE! The first computer movie with SOUND. See the incredible 256 color VGA graphics while hearing the actual dialog OURS EXCLUSIVELY!

SeXXy Disk #CC3 • THE BEST MOVIE! The best computer movie available. Only for the serious collector. 256 stunning VGA colors.

1 Movie \$29. 2 Movies \$49. 3 Movies \$65.
All CC Disks Require VGA monitor and hard disk - over 1 MB of action.

SeXXyCapades - The first adult game with TRUE SOUND and 80 sizzling 256 color VGA scenes • Sexual preference and foreplay options • Play with 2-8 close friends • Over 5MB of pure action! • Fulfill your sexual desires with new experiences • Find out how your partner would really like to make love
\$79 - Special Offer \$69 with purchase of any CC disk above - OURS EXCLUSIVELY!

ADD \$3 S/H • 3.5" Or FOREIGN ORDERS ADD \$2/DISK • IN PA ADD TAX

VISA/MC Orders only 800-243-1515 Ext. 600CU

24 HRS./7 DAYS • Or check/MO to: SeXXy Software, 2880 Bergey Rd., Dept 600CU, Hatfield, PA 19440

CIRCLE 622 ON READER SERVICE CARD

XXX-RATED CD-ROM

Must state age 21
Other Products Available

\$59.88

- + 70 VGA movies
- + Over 600 VGA GIF images - 640x480 & up
- + Completely menu-driven; Easy to use
- + Setup & compressed for use on 88S
- + DOS & Windows utilities included
- + No hard drive installation required

CIRCLE 623 ON READER SERVICE CARD

Send check/money order to:
Starware Publishing Corp
P.O. Box 4188, Dept. 69
Deerfield Beach, FL 33442

Add \$3 S&H
Add \$3 Foreign
FL add 6% sales tax

800-354-5353

24 HOURS / 7 DAYS
US & Canada Orders

For more information,
Credit Card FAX Orders
& Foreign Orders call
Voice 305 - 426 - 4552
FAX 305 - 426 - 9801

Where Adults Come To Play! ODYSSEY BBS

- Local Numbers Covering 850 US Cities
- CB Style Group and Private Chat
- 1000's Of Shareware Programs
- Giant Message Forums
- Matchmaker Dating Database

- Interactive Multiplayer Games
- National Classified Ads

FOR FREE DEMO AND LOCAL NUMBER CALL
818-358-6968

BY MODEM MUST BE OVER 18 3/12/2400 BPS/1

Adults Only.

Meet Goldie and 24 other models on the BodyCello 5-disk (3.5" disks) Sampler Set. Includes 25 color images in GIF, a picture viewer, and your FREE BodyCello catalog. Part #3-10, \$39.95 add \$4.75 for s/h OR Send \$5.00 to receive your BodyCello adults only 4-color catalog.

Orders: BodyCello
P.O. Box 910531 • Sorrento Valley, CA 94031

CIRCLE 625 ON READER SERVICE CARD

Classified Advertising Information
(800) 825-4237

FINANCIAL

Investment Charting



**METASTOCK
PROFESSIONAL**

\$349

Demo Disk - \$5

Version 2.0 has 100+ new enhancements! Perform sophisticated technical analysis on stocks, bonds, futures, mutual funds, etc. Features multiple windows, 45+ pre-programmed indicators, powerful formula builder, profit tester, unattended operation, plus much more! Compatible with 20 data services. For complete literature, call toll-free

1-800-882-3040

EQUIS International, Inc.

Box 26743 S.L.C. UT 84126 (801) 974-5115

CIRCLE 626 ON READER SERVICE CARD

FLOW CHART

GRAPHICS

MAILING PROGRAMS

RFFlow
Professional Flowcharting
For Microsoft® Windows

Create professional, fine quality charts quickly and easily. Call for free trial disk: (303) 663-5767 FAX (303) 669-4889

\$129.00 **RFF ELECTRONICS**
1553 Harper Court, Colorado Springs, CO 80938

CIRCLE 627 ON READER SERVICE CARD

Computer Images



Use toll-free 800 # to sign up with credit card. Once verified use same 800 # to download files.

1-800-GO-MODEM

Or use direct dial 64 Line BBS at (503) 697-5100 8/N1

SuperVGA 1024x768x256

ASTRONOMY • HUGE ADULT AREA
SCENIC • GRASP • ANIMATOR • 3D
STUDIO MOVIES • SOUND • GAMES
UTILITIES • IMAGE CONVERTERS

Event Horizons Commercial BBS. thousands of images and movies Must be 21 to download from adult areas Quality Color SuperVGA/VGA/EGA. 1200/ 2400 bps \$12/hr. 9600 bps \$48 hr., 800# \$8/hr extra. Also Professional Image Scanning from prints or slides to disk.

No Modem? Order our Mail Image Library with samples \$9. Worldwide shipment. Info voice line 503-697-7700. All credit cards accepted. Same day shipment.

Event Horizons

311 Ave. B, Ste. 209
Lake Oswego, OR 97034
Voice 503-697-7700, BBS 800-466-6336, or BBS 503-697-5100

CIRCLE 631 ON READER SERVICE CARD

FOREIGN LANGUAGES

¡HOLA! CIAO!

IBM TUTORIALS FOR
LEARNING LANGUAGES!

- VOCABULARY TUTOR •
- TENSE TUTOR •
- PRONUNCIATION TUTOR •

Most Products Feature
Extensive Digitized Sound!

CALL TOLL-FREE TODAY
FOR OUR CATALOG!
1-800-726-5087

THE HYPERGLOT SOFTWARE
COMPANY P.O. BOX 10746,
KNOXVILLE, TN 37939-0746

CIRCLE 628 ON READER SERVICE CARD

Diplomat Software Series
Alphabets Of The World For Your PC
by Mike Alphabets

Series of 36 alphabets providing both English and foreign characters for screen, keyboard and printer support while using existing software WordPerfect, Word, Windows, Quattro Pro, Ventura Publisher, Works, dBase, ... more.

Starter Package \$185
Windows Support \$85
PerfectaWord Support \$125
LaserTran \$75
LaserTran is sold only with purchase of Starter package or Support package.

Diplomat Software
3700 Campus Drive, Suite 202, Newport Beach, CA 92660
Phone (714) 474-0888, Fax (714) 250-8117

CIRCLE 629 ON READER SERVICE CARD

GRAPHICS

Basic Design of a
CMT Table

CoDraw
Technical Drawing Software
Publication-quality results. Just \$159.
John Dvorak says it is:
"Genuinely Interesting Software"

CoHort Software (510) 524-9878
P.O. Box 1149, Berkeley, CA 94701
(This ad was created with CoDraw.)

CIRCLE 630 ON READER SERVICE CARD

Classified Advertising
Information
(800) 825-4287

LET OUR M.O.M. RUN YOUR MAIL ORDER BUSINESS!

Mail Order Manager™ - the complete solution for your mail & phone order business - order entry/review, credit card processing, UPS manifesting, profit analysis, accounting. Clipper compiled / dBase III+ files. Editor's Choice - find out why more people buy M.O.M. than any other management system. Single user system \$1195 Networks from \$2295 Demo \$25 (ref.) Dydacomp Development Corp., Box 641, Dept. PCM, Wayne, NJ 07470

CALL 1-800-858-DMOM or 1-201-694-7677

CIRCLE 632 ON READER SERVICE CARD

Powerful Mailing Software

PostWare offers the CASS-certified accuracy you need and the power you demand for business mailings. Standardizes, corrects and adds ZIP, ZIP + 4 and car-it to addresses, presorts 1/2/3 Class, offers merge-purge processing; prints barcodes and more so you qualify for postal discounts.

Postalsoft, Inc.
4439 Mormon Coulee Rd
La Crosse, WI 54601-8231
800 831-6245, or 608 788-8700 (WI)

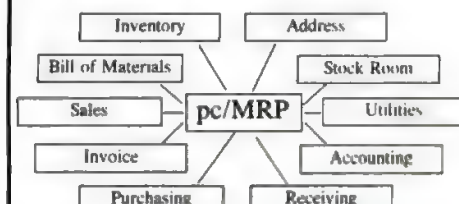
The Mail Order Wizard

Complete management system for a catalog, inbound telemarketing, or mail order company. Order processing, inventory mgt, ad forecasting, sales banking, list mgt, modem charge approval, EDC, UPS manifest w/scale. Single and Multi-User systems. Inbound/Outbound Editor's Choice!

The Haven Corporation
802 Madison St., Dept. M491
Evanston, IL 60202
800 782-8278, 708 869-3434

MANUFACTURING

The Complete Business Management Software Package



Compatible With:
Lotus, dBASE, Fox,
Clipper, dBase, and
Quick Silver

Demo Pkg. \$ 35
Sm Business Pkg. \$179
Lg Business Pkg. \$345
Multi user Pkg. \$645
To order call:
Software Arts
408 248-6445

CIRCLE 633 ON READER SERVICE CARD

MUSIC

new PianoWorks

Self-Paced, MIDI-Interactive Instructional Software for
Beginning Piano from the Publishers of MusicPrinter® Plus!

Temporal Acuity Products, Inc. • 300-120th N.E. Bldg 1 • Bellevue, WA 98005

for info: (206) 462-1007 • 800-426-2673

CIRCLE 634 ON READER SERVICE CARD

MUSIC POWER!

Unleash the music in your PC!
We have a broad selection of powerful, reasonably priced music software, including:

Call 800-535-TONE for orders, information, or free catalog
thoughtprocessors • 584 Bergen St • Brooklyn, NY 11238 • (718) 857-2860

CIRCLE 635 ON READER SERVICE CARD

SONGWRITING MUSIC PROCESSOR

Prints professional sheet music, songs, scores with text, chords, dynamics. Compose, edit, record, play, transpose, copy, extract, import, publish - all in standard notation Symbol editor/librarian. PC, MIDI or SMF entry & playback. Matrix/laser printers \$119.95 + \$5 s/h. Free sample output

SONGWRITING SOFTWARE
7 Loudoun Street, S.E., Suite 5A
Leesburg, VA 22075
1 (800) 877-8070 (703) 777-7232

Did you know...

83% of PC Magazine's subscribers have purchased or authorized the purchase of PC products from direct marketers in the last 12 months.

PROGRAMMERS TOOLS

SPF/2™ — The ISPF-Style Editor

SPF/2 brings a true ISPF/PDF mainframe editing experience and programming environment to PC users running OS/2® or 386+ DOS machines. You'll find the same familiar environment, command structure, and editing capabilities as on the mainframe. In OS/2, you even use the same REXX macros.

SPF/2 offers instantaneous response time, integration with most COBOL workbenches, and Windows™ and PM compatibility. Try it today. Call for details or a free demo.

Command Technology Corporation
Ph: 510-521-5900 Fax: 510-521-0369

All products names are trademarks of their respective owners

FREE demo — Call 800-648-6700 — Ask for #256

CIRCLE 636 ON READER SERVICE CARD

RELIGION

CHURCH SOFTWARE

Discover for yourself why more churches are choosing **PowerChurch Plus®**. Try out the leading membership and accounting package. Call today for your **FREE** full-working DEMO.

FI SOFTWARE, 6300 Variel Avenue, Suite H, Woodland Hills, CA 91367
(800) 486-1800 (818) 888-1800

CIRCLE 637 ON READER SERVICE CARD

SECURITY

STOP SOFTWARE PIRACY

Developers Say...

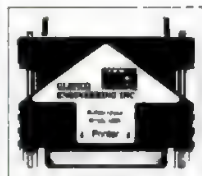
"Since the Hardlock uses an algorithmic response chip, I am assured of the highest level of protection. Also, the optional programmable memory means I can keep custom configurations in Hardlock. I can protect my .EXE or .COM files directly and/or incorporate Glenco's high level language interface routines into my software."

Accountants Say...

"Since our software can't be copied, our revenue has steadily increased. The unique programming board allows us to program the Hardlock in seconds. This ensures optimum delivery schedules from Glenco and a lower inventory cost for us. Hardlock's field programmable feature means a single Hardlock can protect more than one product."

End Users Say...

"Hardlock allows me to backup my software investment. I just plugged Hardlock into the printer card, connected the printer cable, and forgot about it."



Hardlock

Programmable, algorithmic response and memory option — all in one

Call for information on our disk-based systems.

GLENCO

ENGINEERING INC.

SERVING THE SOFTWARE INDUSTRY SINCE 1979

CIRCLE 638 ON READER SERVICE CARD

270 Lexington Drive
Buffalo Grove
Illinois 60089-6930
(708) 808-0300
FAX 808-0313
1-800-562-2543



PUBLIC DOMAIN/SHAREWARE



Public
(software)
Library

The distinguishing feature of PSL is meticulous attention to detail... Personal Computing PSL is the class act of the industry.. CD-ROM End User

Call for a free newsletter:

800-2424-PSL 713-524-6394
Member - ASP
CIRCLE 639 ON READER SERVICE CARD

Classified Advertising Information
(800) 825-4237

SECURITY

BIT-LOCK® SECURITY

Piracy SURVIVAL 8 YEARS proves effectiveness of powerful multilayered security. Rapid decryption algorithm. Device transparent to PARALLEL or SERIAL port. Complemented by low cost KEY-LOCK™ multifunctional COMPU-LOCK™ Countdown, timeout, data encoding, multi-product protection, DOS/UNIX Access control MICROCOMPUTER APPLICATIONS
3167 E. Otero Circle
Littleton, CO 80122
(303) 770-1917



PROTECT YOUR SOFTWARE TODAY

Since 1986, thousands of companies worldwide have chosen Az-Tech Software as partners in their fight against Software Pirates. Why? Because Az-Tech offers you:

• DATE & EXECUTION LIMITS* COMPRESSION
• ENCRYPTION* SERIALIZATION* REMOTE RESET

All of this and now our newest releases in both Hardware and Software based protection:

EVERLOCK 3.0

- * OPTION BOARD SAFE
- * CPU LOCK
- * REMOTE REGISTRATION
- * CD ROM LOCK
- * WINDOWS COMPATIBLE

with over 14 new features you have asked for over the years. If Software based protection is what you need, don't settle for anything less than EVERLOCK 3.0.

These systems are easy to use and most importantly, they work! No other product can provide the Compatibility, Flexibility, Ease of Use and Degree of Protection that you receive with Az-Tech products.

Call Today For A FREE DEMO

1-800-227-0644

Az-Tech Software, Inc.

201 East Franklin, Suite 11 Richmond, MO 64085

(816) 776-2700 LEADERS IN SOFTWARE SECURITY FAX (816) 776-8398



EVERKEY LOCKS

We have combined the Versatility of Az-Tech Software and the ONE WIRE Hardware Compatibility of Dallas Semiconductor in this new package.



COMPATIBILITY

SECURITY

EASE OF USE

CIRCLE 640 ON READER SERVICE CARD

FREE - 15 DISKS OF OUR BEST SELLING SOFTWARE

FREE! 53 games • 675 clip art images • 88 Windows™ programs • 36 educational programs. Each collection comes on 15/5.25" or 8/3.5" disks. Credit Cards only!

PAY \$5.00 SHIPPING AND HANDLING PER COLLECTION

SMC SOFTWARE PUBLISHERS
619 931-8111 EXT 511

CIRCLE 641 ON READER SERVICE CARD

FREE IBM & MAC SOFTWARE CATALOG

24 Pages! ASP Member

SOFTSHOPPE, INC.

P.O. BOX 3875
ANN ARBOR, MI 48106
Tel: (313) 761-7638
FAX: (313) 761-7639



Toll-Free—24 Hrs.
1-800-851-8089

CIRCLE 642 ON READER SERVICE CARD

UTILITIES

REMOVE HARDWARE LOCKS

Maintain Productivity !

Software utility that allows for the removal of hardware locks

Easy - Simple - Guaranteed

These and others are available:

MaxRoute	\$250.00
Pads PCB	\$ 99.00
CadKey	\$ 99.00
MasterCam	\$250.00
Tango PCB II	\$ 99.00
MicroStation	\$ 99.00
PCAD	\$199.00

Visa and Mastercard Welcome
Call or Fax for more information

SafeSoft Systems Inc.

202-1100 Concordia Ave

Winnipeg, MB Canada R2K 4B8

Phone 204-669-4639

Fax 204-668-3566

CIRCLE 643 ON READER SERVICE CARD

WINDOWS

Custom Windows Programming

- Experienced
- Quick Results
- Large Staff

McClure Consultants Ltd.
Barrington, Illinois 708-382-6233

CIRCLE 644 ON READER SERVICE CARD

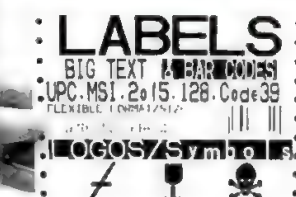
PC Magazine Classified

is #1 in classified ad
lineage in IBM-
Standard computer
publishing. Join the
winning team and
place your ad.

Call (212) 503-5115
or (800) 825-4237

MISCELLANEOUS/BAR CODING

BAR CODE HEADQUARTERS



LABELING SOFTWARE

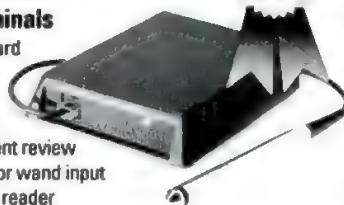
- For Epson, Oki, IBM, and LaserJet.
- Flexible design. Any Format or size.
- On-Screen Label Design, WYSIWYG.
- 16 text sizes — 3" reads at 100'
- Bar codes: 2of5, 128, UPC/EAN, AIAG, MIL-STD, ZIP+4, & Code 39
- Auto-incrementing. File input.
- Logos, symbols — from scanners.

- Reversals, color, soft fonts. Powerful, Versatile, Fast, Easy!
- Rotatable, shadable, scalable fonts from 1" to 13" on LaserJet III
- Above label printed with LabelRIGHT™ — \$279
- Other menu driven programs from \$129. SCO/UNIX — \$199

BAR CODE READERS

for PC, XT, AT, PS/2, Mac
and all RS-232 Terminals

- Attaches as 2nd keyboard
- No software changes
- 2of5, UPC/EAN, 128, Codabar, MSI, Code 39
- Top rated by independent review
- Magstripe, laser, CCD, or wand input
- 1 or 2 input devices per reader
- 100 configurable options
- Complete with steel wand — \$399



PC MAGAZINE
Outstanding
Value and
Performance

PORTABLE READERS

- Battery operated reader. Simple, powerful!
- 64 or 256K memory
- Bar code or keyed input
- Codabar, 2of5, UPC/EAN, 128, Code 39
- Easily programmable prompts.
- RS-232 or keyboard models
- Doubles as non-portable reader.
- Downloaded verification tables
- Programming is easier than BASIC
- Wand, CCD or laser input
- Complete 64K units with wand — \$799



WORTHINGTON

DATA SOLUTIONS

417 Ingalls Street • Santa Cruz, CA 95060

800-345-4220

FAX 408-458-9964 • 408-458-9938

Did you know...

On average, PC Magazine's direct market purchasers have spent—

- \$30,000 on hardware
- \$5,400 on software
- \$2,100 on accessories
- an average of \$2,855 per order

PC Magazine is exclusively read by over 870,000+ business buyers and brand specifiers, including computer resellers and consultants.

Get all the facts. Call your PC Magazine Marketplace Account Representative for more information or to place your ad, 212-503-5115 or 800-825-4237.

PC CLASSIFIED

BAR CODING

BAR CODE READERS

AMERICAN MICROSYSTEMS

2190 A Regal Pkwy. • Euless, Texas 76040 • (817) 571-9015

FOR PC, XT, AT, PS/2 & TERMINALS:

- No software changes required
- Data appears as keyboard input
- Reads Code 39, 1-2of5, UPC/EAN
- Codabar, 128, 93, 11, MSI/Plessey
- Auto-discriminates between codes
- Accepts WAND, SLOT, CCD, LASER, MAG STRIPE

BAR CODE PRINTING SOFTWARE:

- For Epson, OKI, IBM, Dot Matrix and HP LaserJet Printers.
- Prints Code 39, 1-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey
- Easy to use

PORTABLE READERS:

- Use as a portable, wedge or terminal
- Input Devices: WAND, CCD, or 5V LASER
- Real-time clock for date and time stamps
- Automatic power off with resume

(800) 648-4452 • FAX: (817) 688-4332
30 Day Money Back Guarantee
One Year Warranty

CIRCLE 645 ON READER SERVICE CARD

ITS BAR CODE READERS

MORE FEATURES MORE AFFORDABLE

NEW IMPROVED

Starting at \$279 with wand! • Transparent operation. • No software required • PC, XT, AT, Mac, PS2, others. Look into our full line of reliable, competitively priced readers, keyboard and serial wedges, portable data collectors, multi-drop readers, wands, laser scanners, mag stripe readers, and bar code printing software • OEM and reseller discounts. We provide solutions to systems! Custom application software for Data Collections available. Call for details.

INTERNATIONAL TECHNOLOGIES & SYSTEMS CORP.

655-K North Berry St., Brea, CA 92621
 (714) 990-1880 • FAX (714) 990-2503
 13 Welwyn Ct., Richmond, VA 23229
 (804) 741-6725

CIRCLE 646 ON READER SERVICE CARD

EZBarcode® Readers

for PC, PS/2, Terminals

- Five year warranty - the best in the industry
- Free bar code printing utility included
- Installation in minutes - no drivers or software changes necessary
- Auto-discriminating reads all standard symbologies
- In stock, fast shipping
- 30-day money back guarantee

\$289 with rugged 1000-wand

with stainless steel wand **\$349**

track 1 mag stripe reader add **\$100**

with laser scanner **\$1385**

with 1" CCD scanner **\$885**

RS-232 serial version add \$50

Also available: Portable bar code readers and bar code printing software

TimeKeeping Systems, Inc.

1306-B East 55th Street • Cleveland, OH 44103
 (216) 361-9995 • FAX (216) 361-0030

DATA CONVERSION

DATA CONVERSION

If you want the most complete conversion services in the industry, just call...

(800) CONVERT

Capabilities include over 3000 formats

PIVAR COMPUTING SERVICES, Inc.

165 Arlington Heights Rd. #M
 Buffalo Grove, IL 60089
 (708) 459-6010

CHANGING WORD PROCESSORS?

Media transfer to or from
 IBM, XEROX, DEC, WANG, EXXON, MACS, LANIER, CPT, CT, MICOM, NBI, WRDPLX, WORDSTAR, WORDPERFECT, MS/WRD, DW4, MULTIMATE, SAMNA, MASII, DCA

*****FREE TEST VERSION*****

Conversion Specialists
 531 Main St., Suite 835
 El Segundo, CA 92045
 (310) 545-6551
 (800) 825-0540

TOTAL SERVICE CONVERSIONS

- OUR NAME SAYS IT ALL •
 - Quality Service •
 - Quickest Turnaround •
 - Lowest Prices •
 - Free Test Conversion •
 - WordPerfect Training available •
 - 1-800-5-CONVRT (526-6878) •
- TOTAL SERVICE CONVERSIONS, INC.
 1933 North Monon Street
 Los Angeles, CA 90027

QUALITY CONVERSIONS

- Convert IBM, CPT, MAC, DEC, NBI, WANG, LANIER, XEROX, VYDEC, 3000+ others
 - Customization available
 - 9-Track and most Cartridges
 - Scanning - OCR - IMAGES
 - Databases, Mail lists, Spreadsheets
 - BEST RATES • FAST • FREE TEST
- 1st RUN COMPUTER SERVICES INC.
 1261 Broadway, Suite 508
 New York, NY 10001
 (212) 779-0800 • (800) 833-2207

To place your ad in
PC MAGAZINE CLASSIFIED
 Call **(212) 503-6115**
 or **(800) 825-4287**

DATA RECOVERY SERVICES

Ontrack Data Recovery

The Leader in Data Recovery Services

- 95% Success Rate
- Fast Turn Around
- Professional Clean Room
- Expertise with Novell, DOS, Macintosh, OS/2, Unix, Xenix, Bernoulli, Sun and more!

1-800-872-2599

INT'L: 612-937-5161 • FAX: 612-937-5750
 6121 Burs Drive, Eden Prairie, MN 55446



Ontrack

DISK CONVERSION

Low Cost Data Conversion to or from all systems

- Over 3,000 Formats
- 9 Track Tape → Disk
- Disk → 9 Track Tape
- Tape Duplication
- 24-Hour Turnaround Available
- All Work Guaranteed!

Call 1-800-743-3723

in Massachusetts 617-237-9191

J. Alexander Clark & Associates
 Since 1984

CIRCLE 647 ON READER SERVICE CARD

TAPE TO FLOPPY FLOPPY TO TAPE TAPE DUPLICATION FLOPPY TO MICROFICHE LASER PRINTING

1-800-422-9622

(In OK: 918 254 9622)



TECHNICAL PROGRAMMING SERVICES, INC.
 8506 EAST 61ST STREET
 TULSA, OK 74133 1301

CIRCLE 648 ON READER SERVICE CARD

Calling about an ad? Say you saw it in

PC Magazine Classified



READER SERVICE CARD FREE INFORMATION

IT'S AS EASY AS 1, 2, 3

1. Fill in your name and address and check off your answers to the nine research questions
2. Circle the numbers on the card that correspond to the ads or articles you'd like more information about
3. The literature will be mailed to you from the advertiser free of charge

Void after September 30, 1992

CIRCLE FOR FREE INFORMATION

001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200

1. Do you work in a DP/MIS department? 01. ☐ Yes 02. ☐ No 2. Please indicate your company or organization's primary business activity: (Check one only) 01. ☐ Manufacturer of Computer Equipment, Computers, Software 02. ☐ Manufacturer—Aerospace 03. ☐ Manufacturer—Other 04. ☐ Systems House 05. ☐ Computer Consultant 06. ☐ Computer Retailer/VAR/VAD Distributor 07. ☐ Communications 08. ☐ Finance/Banking/Insurance/Real Estate/Accounting 09. ☐ Education 10. ☐ Government—Federal 11. ☐ Government—Non-Federal 12. ☐ Research and Development 13. ☐ Data Processing/Computer Service 14. ☐ Health/Medical/Legal Service 15. ☐ Engineering/Architecture	16. ☐ Agriculture/Construction/Mining/Oil/Transportation/Utilities 17. ☐ Non-Computer Retailer/Distributor 18. ☐ Other Business or Service 99. ☐ Other 3. Please indicate your primary business function: (Check one only) 01. ☐ DP/MIS 02. ☐ Systems, Programming 03. ☐ Communications 04. ☐ Engineering 05. ☐ Res./Dev./Scientific 06. ☐ Accounting/Finance 07. ☐ Computer Consulting 08. ☐ Purchasing 09. ☐ Operations 10. ☐ Production 11. ☐ Education/Training 12. ☐ Marketing/Sales 13. ☐ Medical/Legal 14. ☐ Admin./Mgmt. 99. ☐ Other	4. Is your company a reseller? 01. ☐ Yes 02. ☐ No 5. For how many IBM PCs and compatibles do you specify brands of products: 01. ☐ 10 or less 03. ☐ 26-99 02. ☐ 11-25 04. ☐ 100 or more 6. Are there any PCs in your office? (Check all that apply) 01. ☐ Linked to mainframe 02. ☐ Linked to mini 03. ☐ Networked together 7. Please check the equipment currently installed at your location: (Check all that apply) 01. ☐ IBM or Compatible PCs 02. ☐ IBM or Compatible Mainframes 03. ☐ IBM or Compatible Minis 04. ☐ Macintosh	8. Do you plan to buy any PC Products? 01. ☐ Now 02. ☐ In 4 to 6 months 03. ☐ In 7 to 12 months 04. ☐ No definite plans 9. Number of Employees in your entire company: 01. ☐ 25 or less 02. ☐ 26-99 03. ☐ 100-499 04. ☐ 500-999 05. ☐ 1000 or more
---	---	---	---

PLEASE PRINT CLEARLY

Name _____

Title _____ Telephone _____

Company Name _____

Address _____

City _____ State _____ Zip _____

☐ Please send me one year (22 issues) of PC Magazine for \$29.97. Offer valid in U.S. only

Free Product Information

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 433 RIVERTON, NJ

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. BOX 1687
RIVERTON, NJ 08077-9687

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



Free Product Information

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 433 RIVERTON, NJ

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. BOX 1687
RIVERTON, NJ 08077-9687



READER SERVICE CARD FREE INFORMATION

IT'S AS EASY AS 1, 2, 3

1. Fill in your name and address and check off your answers to the nine research questions
2. Circle the numbers on the card that correspond to the ads or articles you'd like more information about
3. The literature will be mailed to you from the advertiser free of charge

CIRCLE FOR FREE INFORMATION

Valid after September 30, 1992

036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------

1. Do you work in a DP/MIS department? 01. ☐ Yes 02. ☐ No	16. ☐ Agriculture/Construction/Mining/ Oil/Transportation/Utilities	4. Is your company a reseller? 01. ☐ Yes 02. ☐ No	8. Do you plan to buy any PC Products? 01. ☐ Now 02. ☐ In 4 to 6 months 03. ☐ In 7 to 12 months 04. ☐ No definite plans	9. Number of Employees in your entire company: 01. ☐ 25 or less 02. ☐ 26-99 03. ☐ 100-499 04. ☐ 500-999 05. ☐ 1000 or more
2. Please indicate your company or organization's primary business activity: (Check one only.) 01. ☐ Manufacturer of Computer Equipment, Computers, Software 02. ☐ Manufacturer—Aerospace 03. ☐ Manufacturer—Other 04. ☐ Systems House 05. ☐ Computer Consultant 06. ☐ Computer Retailer/VAR/VAD Distributor 07. ☐ Communications 08. ☐ Finance/Banking/Insurance/ Real Estate/Accounting 09. ☐ Education 10. ☐ Government—Federal 11. ☐ Government—Non-Federal 12. ☐ Research and Development 13. ☐ Data Processing/Computer Service 14. ☐ Health/Medical/Legal Service 15. ☐ Engineering/Architecture	3. Please indicate your primary business function: (Check one only.) 01. ☐ DP/MIS 02. ☐ Systems, Programming 03. ☐ Communications 04. ☐ Engineering 05. ☐ Res./Dev./Scientific 06. ☐ Accounting/Finance 07. ☐ Computer Consulting 08. ☐ Purchasing 09. ☐ Operations 10. ☐ Production 11. ☐ Education/Training 12. ☐ Marketing/Sales 13. ☐ Medical/Legal 14. ☐ Admin./Mgmt. 99. ☐ Other	5. For how many IBM PCs and compatibles do you specify brands of products: 01. ☐ 10 or less 03. ☐ 26-99 02. ☐ 11-25 04. ☐ 100 or more	6. Are there any PCs in your office? (Check all that apply.) 01. ☐ Linked to mainframe 02. ☐ Linked to mini 03. ☐ Networked together	PLEASE PRINT CLEARLY Name _____ Title _____ Telephone _____ Company Name _____ Address _____ City _____ State _____ Zip _____

Please send me one year (12 issues) of PC Magazine for \$29.97. Offer valid in U.S. only.

DISKETTE COPY SERVICES

INSURANCE

SUPPLIES

Duplication	Packaging	Equipment
• Diskettes & Tapes • Virus Scanning • Modern Transfer • Copy Protection	• Custom Packaging • Custom Printing • Package Assembly • Distributive Shipping	• Disk Duplicators • Labelers & Sleevers • Maintenance • Facility Management

MEGAsoft Freehold, NJ 07728
FAX: (908) 462-5658
(800) 222-0490

CIRCLE 649 ON READER SERVICE CARD

SAFWARE
INSURES YOUR COMPUTERS

Full replacement of hardware media purchased software. As low as \$49 yearly. Covers fire, theft, power surges, other accidents. Blanket coverage, no list of equipment needed. Call for information or immediate coverage.

1-800-848-3469
Local (614) 262-0559

SAFWARE The Insurance Agency Inc.
2929 N. High Street P.O. Box 02211
Columbus, OH 43202

CIRCLE 653 ON READER SERVICE CARD

BULK DISKS
SONY DYSAN
VERBATIM

	Blank	Formatted
5 1/4" DS/DD	.33	.37
5 1/4" DS/HD	.45	.59
3 1/2" DS/DD	.49	.62
3 1/2" DS/HD	.87	.99

5 1/4" INCLUDE SLEEVES 24 HOUR SHIPPING

800-426-0247

We also provide software duplication service and sell & service PRINCETON DISKETTE duplication equipment

1101 Richmond Ave., Ft. Pleasant Bch., NJ 08742

CIRCLE 656 ON READER SERVICE CARD

For Expert 24 Hour Software Duplication
Call **800-533-4188**

- ◆ 100% Satisfaction Guaranteed
- ◆ Superb 7 Step QC Process with Digital Diskette Analysis
- ◆ Turnkey Printing, Packaging & Assembly Service Provided

EEHO
DATA SERVICES, INC.
In PA 215-363-2400

CIRCLE 650 ON READER SERVICE CARD

SUPPLIES

TONER CARTRIDGES
REMANUFACTURED
TESTED • GUARANTEED • 24-HR TURN

Send empty cart. with wand.

- HP, Apple, Canon, etc.
- Canon FC & Sharp Z-Copiers
- IBM 4019 - 4 Colors!
- Inkjet Printer Refills - 5 Colors!
- MICR Toner for Laser Checks

Prices From \$45

1-800-239-4027

ADVANTAGE LASER PRODUCTS, INC.
2216 University Blvd • Tuscaloosa, AL 35401
2030 Powers Ferry Rd. S.E. 218 • Atlanta, GA 30339

CIRCLE 654 ON READER SERVICE CARD

DUPLICATION

All disk formats
9-track tapes
1/4" Cartridges

For more
'Dupe Talk'
call

COMPANY COMPENDIA, INC.
312-419-8771
Fax: 312-419-1390
1-800-374-DISK

CIRCLE 651 ON READER SERVICE CARD

Classified Advertising Information
(800) 825-4237

\$ BEST TONER CARTRIDGE BUY \$

Remanufactured Cartridges Starting at: **\$19**

- 100% Guaranteed
- 24 Hr Turn Around
- Program Discounts

All Brands - HP, IBM, Sharp, Canon, Mita, etc.

1-800-84-REFILL
In NYS call (914) 592-4969
Visa & Mastercard Accepted

CIRCLE 655 ON READER SERVICE CARD

SOFTWARE

- ◆ Highest Quality Media
- ◆ Competitive Pricing
- ◆ 24 Hour Turnaround
- ◆ Total Quality Assurance
- ◆ Custom Labels & Packaging
- ◆ Excellent Service

DUPLICATION

(800) 426-0247
PRINCETON DISKETTE

1101 Richmond Ave., Ft. Pleasant Bch., NJ 08742

CIRCLE 652 ON READER SERVICE CARD

What PC Magazine Classified is all about—

BIG CIRCULATION.

An astounding audience of 870,000+ brand specifiers, more PC product buyers than any other publication delivers. Virtually every PC Magazine subscriber has the expertise and authority to specify brands of personal computers for their companies.

BIG SCOPE.

Advertising in PC Magazine Classified works in a big way. PC Magazine's enormous scope is one reason—but there are many other big reasons why advertising campaigns succeed in PC Magazine Classified. PC Magazine Classified takes advertisers' volume sales message to the biggest audience, and supports that message in an editorial environment that encourages direct response buying.

BIG RESULTS.

PC Magazine Classified gets results. Advertising in PC Magazine Classified compels buyers to act, producing an average 16,462 inquiries per issue (an average 146 inquiries per advertiser per issue). Bottom line, PC Magazine Classified promotes active direct response spending, generating as much as \$200 million in sales revenue through the Classified section alone.

Want to start fully utilizing this gigantic marketing tool? Call your PC Magazine Marketplace Account Representative for more information or to place your ad, 212-503-5115 or 800-825-4237.

PC Magazine's BusinessCard section is a forum for innovative, hard-to-find and low-cost PC products and services. Ads are listed by product category and include Reader Service numbers to allow fast, easy response.

RATES:

1 issue—\$600, 3 issues—\$550, 6 issues—\$510, 12 issues—\$480, 17 issues—\$460, 22 issues—\$450. Multiple-ad per issue rates also available. Prepayment must accompany each insertion. VISA/MC welcomed.

AD FORMAT:

PC Magazine will design and typeset each BusinessCard ad. Advertisers should furnish type-written copy. Ads include: 1) Headline (1 line, initial caps=30 characters max, all caps=25 characters max), 2) Descriptive copy (5 lines, 225 characters max), 3) Company name (same specifications as headline), and 4) Address and telephone number (2 lines, 40 characters per line). No logos, artwork or camera-ready ads. Publisher reserves the right to edit supplied copy to meet section specifications.

DEADLINES:

PC Magazine is published 22 times a year. (bimonthly except for July and August). The BusinessCard closing is approximately two months prior to issue date. Please send copy and payment to: PC Magazine BusinessCard, One Park Avenue, 3rd Floor, New York, NY 10016. ATT: Richard Wortman. For more information, call Richard Wortman at 800-825-1237 or 212-503-5175. FAX: 212-503-5860.

HARDWARE/CD-ROM

750 Favorite Programs CD ROM

750 Shareware & Public Domain programs for PCs—ONLY \$24.95. This includes a membership in our exclusive club the CD America Buying Group call (305)947-1836 and sign up today!

EPS Inc., CD America Group

3229 NE 169th St. Miami, FL 33160
(305) 947-1836

CIRCLE 801 ON READER SERVICE CARD

CD-GAMES

- OVER 300 DISCS OF SHAREWARE GAMES ON ONE CD-ROM.
- ADVENTURES, ARCADE, BOARD, CARD, CASINO, MILITARY, WINDOWS AND MORE.
- ONLY \$24.95 + \$5.00 S/H.

CAMERON LABORATORIES LTD

584 Campbell St., Winnipeg, Mb Canada R3N1C1
VISA ORDERS: 1-800-665-0287

CIRCLE 802 ON READER SERVICE CARD

COMMUNICATIONS

KEYBOARD, VIDEO, MOUSE

EXTENSION with EXTENDER
SPLITTING with COMPANION
SWITCHING with COMMANDER
Boosts SIGNALS UP to 600 FT. Control Up to 96PC's with one KEYBOARD and MONITOR.

CYBEX CORPORATION

2800H Bob Wallace Ave., Huntsville, AL 35805
PHONE 205-534-0011 FAX 205-534-0010

CIRCLE 803 ON READER SERVICE CARD

COMPUTER SYSTEMS

386/486 Systems at Wholesale

386-25 *SALE* \$1010 486-33 64k.c. \$1440
386-33 64k.c. \$1110 486-33 256k.c. \$1490
Inc: 28dp SVGA color mon w/1m card, 1.2&1.44m
FD, 1m RAM, 42m HD, 2s1p1g, 101KB, 1yr wrnty.
** 4m RAM...Add \$120 ** 85m HD...Add \$110

STARLIGHT COMPUTERS CO.

2828 W. Parker Rd. #202-C, Plano, Tx 75075
1-800-878-8198 214-596-4785/Fax: 596-4887

CIRCLE 804 ON READER SERVICE CARD

MARKETING POWER

Is yours when you place your message in this space. Reach 870,000+ buyers of all kinds of PC products. Give your business card PC Magazine Marketplace Power.

BusinessCard

Call Richard Wortman today.
1-800-825-4237

CIRCLE 805 ON READER SERVICE CARD

DISK DRIVES

PS/2 DISC DRIVES

PS/2 Kits	HD for 50Z,55SX, & 70
20Mb \$195	80Mb \$379 30Mb \$245
30Mb 205	100Mb 475 60Mb 575
40MB 235	200Mb 795 120Mb 695

Call for other PC Drives & Kits

jb TECHNOLOGIES, INC.

5105 Maureen Lane, Moorpark, CA 93021
(800) 688-0908 * FAX (805) 529-7712

CIRCLE 806 ON READER SERVICE CARD

New SRAM Solid State Disk

4 to 64Mbytes - NO MOVING PARTS - NO SOCKETS
ROBUST/RELIABLE/FAST. All SMT. Non-Volatile.
Fits AT/ISA bus - DOS compatible.
No external software required. From \$1590.

Business Machine Interfaces, Inc.

1-800-663-4605 (USA)
(416) 756-9477 Fax (416) 756-4118

CIRCLE 807 ON READER SERVICE CARD

EXPANSION UNITS

BIOS ROM UPGRADES

Our experienced technicians can help you upgrade your IBM XT, AT, or XT/286/386 compatible. An AWARD BIOS will add support for IDE drives, 3.5" 1.44Mb floppies, DOS 5.0, Windows 3.0 FREE CAT-ALOG. Authorized Award Distributor.

KOMPUTERWERK, INC.

851 Parkview Blvd., Pittsburgh, PA 15215
(800) 423-3400 - (412) 782-0384

CIRCLE 808 ON READER SERVICE CARD

PERIPHERALS

??? RADIOACTIVE ???

Plot it on PC with RM-60 Rad. Monitor+Alarm. Serial or LPT port. Alpha-Beta-Gamma-Xray. RADON + Sources*WINDOWS*MicroR:1000X survey geigers Background*Foods*Clouds. TSR. GM tube. PC Mag & Byte rev. V/MC*\$149.50*45 day \$back.

AWARE ELECTRONICS CORP.

P.O. Box 4299, Wilmington, DE 19807
(800)729-5397 Phone or Fax: (302)655-3800

CIRCLE 809 ON READER SERVICE CARD

THE RINGMASTER

Distinctive ring controller. Separate telephone numbers, one telephone line! Get professional and save money. Give your fax or modem its own telephone #. No more unreliable fax switchers. Only \$89.95. Interested? Call (or fax) for details!

Lucas Technologies, Inc.

48 Howland Ave. Beacon, NY 12508
Phone (914) 838-3040 Fax (914) 838-1770

CIRCLE 810 ON READER SERVICE CARD

PRINTERS

PANASONIC RENEWED

KX-P1123 24-Pin, 192cps, 53LQ, 7 Fonts\$179
KX-P1124 24-Pin, 300cps, 100LQ, 11 Fonts \$249
KXP-1624 24-Pin, Wide Car, 192cps, 63LQ.....\$299
KX-P4420 Laser, 8ppm, 22 Fonts, 300dpi... \$649
KX-P4450 Laser, 11ppm, 28 Fonts, 300dpi...\$995

ELECTRIFIED DISCOUNTERS

1066 Sherman Ave., Hamden, CT 06514
800-678-8585, 203-287-1976, FAX 203-248-8680

CIRCLE 811 ON READER SERVICE CARD

SOFTWARE/ACCOUNTING

ACCOUNTING SOLUTIONS

Multiuser Accounting G/L, A/R, A/P, I/C, Payroll
SU/\$49 MU/\$149. Other systems J/C, BOM,
Order entry. Call for Prices. Working demos \$10.
All systems use Btneve(c). Source Code+4GL Lang
available. Dealers wanted.

Computer Accounting Solutions

1-(800) 358-4222 or (714) 335-1205
Redlands California

CIRCLE 812 ON READER SERVICE CARD

BUSINESS

Throw Away Your Old Checks!

BlankCheck prints fully encoded checks on your LJ2/2D/3/3D/3sl. Handles 300 checking accounts. Easily integrated with your accounting system. Complete kit including software, MICR toner, and forms only \$799. Demo \$45.

SouthData, Inc.

PO Box 1703, Mt. Airy, NC 27030
800-628-7227

CIRCLE 813 ON READER SERVICE CARD

A Real Docket for Working Lawyers

DocketMinder - because you need a docket, not just a calendar. A reviewer called it "an excellent value", "easy to set up, easy to learn, and easy to use." It's also easy to pay for: \$100 (30 day money-back guarantee).

Grass Roots Software

5464 N. Port Washington Road, Suite 180,
Glendale, WI 53217 (414) 274-9178

CIRCLE 814 ON READER SERVICE CARD

UPS SHIPPING SOFTWARE

No extra typing required. Works with your accounting software. Computes Zone and Charges. Prints Manifest, COD Tags, Shipping Labels. Hundred-weight, GroundSaver and RPS options. Only \$249. Network \$449 + S/H. Demo \$10.

V-TECHNOLOGIES

P.O. BOX 4321, WATERBURY, CT 06704
(203) 879-6960 Fax: (203) 879-6962

CIRCLE 815 ON READER SERVICE CARD

SOFTWARE/BUSINESS

Point-of-Sale

286 Super slim, 1m, 1FDD, 40m/hd, 9" Display \$695
Star Receipt Printer, Elect. cash drawer \$595
POINT N' SELL, countersale, A/R, PO + Inv. \$595
MicroBiz, RealWorld, Solomoni, E-Basic, Cyme call
label printer, pole displ., touch screen

POSTECH RETAIL SYSTEMS

197 Durham Avenue, Metuchen, NJ 08840
T (908) 549-3935, F (908) 549-6098

CIRCLE 116 ON READER SERVICE CARD

LAN-LESS MULTI-USER ACCOUNTING

Accounts Receivable • Order Entry • Point of Sale
• Inventory Control • Purchase Order • Bill of Materials
• Accounts Payable • Payroll • General Ledger
• Client Write Up • Single-User/Multi-User/ Network
Versions • Dealers Welcome • Demo Available

Account Pro Inc.

P.O. Box B, Old Bethpage, New York 11804
(800)/SEE-A-PRO

CIRCLE 117 ON READER SERVICE CARD

CAD/CAM

Indexer LPT™ Motion Control

- Controls up to six motors simultaneously
- Linear and Circular Interpolation
- Easy-to-use DOS Device Driver • Super Manual
- CAD/CAM Interface Available
- \$249 VISA/MC (OEM Inquiries Invited)

ABILITY SYSTEMS CORPORATION

1422 Arnold Ave., Roslyn, PA 19001
PH: 215-657-4338 FAX: 215-657-7815

CIRCLE 118 ON READER SERVICE CARD

COMMUNICATIONS/NETWORKING

PC VOICE MAIL KIT \$1595

- Voice Processing on your PC • Software and 4 line board included • Order Taking • AUDIOTEX • Voice Messaging • Never miss another call!
- HUNDREDS OF USES • Don't pay \$1,000's CALL TODAY FOR Free DETAILS • 2yr warranty

Amerifax Services Corp.

572 W. Market St. #5, Akron, OH 44303
(216) 253-8787 • (216) 762-6050 Demo

CIRCLE 119 ON READER SERVICE CARD

FileWizard

Analyze NetWare server by user, volume, directory, and file extension, over time. Create action/archive strategies to fit your specific needs. Users retrieve archived files. Full range of Graphical analysis, printed reports & forecasting.

Knozzall Systems, Inc.

375 E. Elliot Rd., Ste 10, Chandler, AZ 85225
800-333-8698 602-545-0006/Fax 0008

CIRCLE 120 ON READER SERVICE CARD

Attention Windows Advertisers!

Open up new sales opportunities with 870,000+ PC brand specifiers—the lion's share of buyers for the record-breaking 5 million copies of Windows sold in just 18 months—by placing your four-color ad in the new section just opened exclusively for you!

PC Magazine Premier Windows

Call today to place your ad here!
800-825-4237

CIRCLE 121 ON READER SERVICE CARD

COMPUTER LANGUAGES

FORTRAN LANGUAGE SYSTEMS

32-bit and other PC Fortran compilers to meet your programming needs. Editor's Choice & Tech Excellence Winners. • Call 800-548-4778 •

LAHEY COMPUTER SYSTEMS

BOX 6091 Incline Village, NV 89450
Tel: 702-831-2500 Fax: 702-831-8123

DATA BASE

dBASE file access from C, Basic,...

CodeBase 4.5 gives database management capabilities and dBASE, FoxPro or Clipper file compatibility from C, C++, Visual Basic or Pascal for Windows. Full 90 day guarantees. FREE DEMO.

Sequiter Software Inc.

#209, 9644-54 Ave, Edmonton, AB, Can. T6E 5V1
Call (403) 437-2410, Fax (403) 436-2999

CIRCLE 122 ON READER SERVICE CARD

ENTERTAINMENT/GAMES

QUIT HORSEING AROUND

Get sports handicapping help. Call or write for our free software catalog on horse racing, greyhound handicapping and sports betting. Prices are affordable ranging from \$8 to \$78. Visa and Mastercard accepted.

SOFTWARE EXCHANGE

P.O. Box 250002-PC, W. Bloomfield, MI 48325
1-800-527-9467 Ph/Fax: (313) 788-3342

CIRCLE 123 ON READER SERVICE CARD

EROTIC FASHIONS ON DISK

Exotic fashions being modeled: 16 frames of popular best sellers from mild to wild. Leather, victorian corsets, PVC dresses, boots, lingerie, etc. 2 disks—slideshow and still-only \$12 plus \$3 S&H State 3.5 or 5 1/4 format. Visa & Mastercard call

Fashion World Int.

P.O. Box 277506 Sacramento, CA 95827
1-800-755-9828 (916) 631-8777 fax 631-9339

CIRCLE 124 ON READER SERVICE CARD

Go, NEMESIS, Go!

Go—a Zen game. So appealing, it has endured 4,000 years. So useful, governments study it. NEMESIS Go Junior entices novices of any age. NEMESIS Go Master Deluxe satiates the addicted. Chaos Manor Users Choice Award (Byte - 1990)

TOYOGO, Inc.

PO Box 25460-M, Honolulu, HI 96825-0460
(800)869-6469 (808)396-5526 fax: 396-4126

CIRCLE 125 ON READER SERVICE CARD

PLAY PROFESSIONAL POKER

- Plays Texas Hold'Em, 5 and 7-card stud, low-ball, 7-card Hi-Lo Split • Any stakes incl. pot-limit + no limit • Tournament play, numerous options, superb VGA graphics, pull-down menus, keyboard or mouse ctrl • \$39.95 + \$3 S+H, ch. or m.o.

NORTHERN SOFTWARE

1192 Rosethorne Rd., Oakville, Ontario, L6M 1H6
416-827-0810

CIRCLE 127 ON READER SERVICE CARD

GAMES OF SKILL & INTELLIGENCE

12 High Quality VGA ONLY Evaluation packages. Fully Functional High-Tech Simulations. You purchase only the software proven useful to your needs. \$14.95 Duplication/Shipping fee. ASP Approved Vendor, V/MC Welcome.

DATA-VISION

795 Hammond Dr. Suite 1104 Atlanta, GA. 30328
1(800) 742-5502 (404) 252-1672

CIRCLE 128 ON READER SERVICE CARD

ADULT VGA SOFTWARE

Stop Paying High Prices for Adult Software! We offer the Best in Adult VGA Software at Lowest Prices. Visa & MasterCard Accepted. Movies, Games, Pictures; 200+ Disks in Stock!
(You must be 21 or older to order.)

CLEARLIGHT SOFTWARE

P.O. Box 1411, Milwaukee, WI 53201
(414) 962-2616

CIRCLE 129 ON READER SERVICE CARD

GENERAL

WASTE SOLUTIONS DATABASE

An environmental database that will provide specific waste reduction, water reuse, recycling and compliance solutions. Actual Situations - Real Life Problems and Solutions. 100% Satisfaction Guaranteed. \$148.

SOLUTIONS Software

1511 Kastner Place, Sanford, Florida 32771 USA
Telephone: (407) 321-7910; FAX: (407) 321-3098

CIRCLE 130 ON READER SERVICE CARD

Student-Teacher-School SPECIAL

Pagemaker 4.0 \$199-WordPerfect 5.1 \$135-Q&A \$99 Corel \$299-Excel or Word/Windows \$189-Ventura \$199-Lotus Windows or 3.1+ \$129-Norton Desktop \$75-Borland C++ \$170-Quattro Pro \$119-dBase \$195 Much More! IBM/MAC call for details.

PERIPHERALS PLUS, INC.

5016 Highway 9, HOWELL, NJ 07731
800-444-7369 908-363-2424 FAX: 908-363-3687

CIRCLE 131 ON READER SERVICE CARD

HEALTH

Nutrition & Fitness Software

The TOP-Rated Software. Lose weight! Plan workouts! Control fat, cholesterol, salt! Plan/analyze menus! GET RESULTS! Personal & professional software. 50+ functions, terrific reports, 2000-11,500 foods. From \$29 - \$995. FREE Demo Disk.

ESHA Research

POB 13028M, Salem, OR 97309-1028
503-585-6242 fax: 503-585-5543

CIRCLE 132 ON READER SERVICE CARD

INVENTORY

INVENTORY MANAGEMENT

Stock-Master 4.0, com. grade system, has Stock Status Rptg, PO Write & Track, Trend Analysis, QC Rptg, Trans Hist Detail Analysis, Multi Loc support, BOM, Matl Req Planning, Serial/Lot No Track, Quote/Ord/Inv Prep.

Applied Micro Business Systems, Inc.

177F Riverside Ave., Newport Beach, CA 92663
714-759-0582

CIRCLE 133 ON READER SERVICE CARD

MAILING PROGRAMS

FREE! Mailer's Software Catalog.

Add Zip+4 & Carrier Routes; Lookup Zip's; Clean up mailing lists; Eliminate duplicates; Find nearest dealer; Select Zips within radius, Zip Code & Phone Location Databases; Zip Code Mapping & more! Save postage, reduce costs! Call for FREE Catalog!

MELISSA Data Corporation

32122 Paseo Adelanto, San Juan Capistrano, CA
92675-3600 800-443-8834

CIRCLE 834 ON READER SERVICE CARD

MAPPING

Affordable Mapping for Everyone!

New release of NCOMPASS for WINDOWS. Open multiple maps. Find addresses. Import ASCII-delim. databases, .BMP files. Supports Windows 3.1 True Fonts. TIGER maps: entire U.S. available. NCompass 2.0: \$129.00. Most counties: \$100.

3CS Software, Inc.

P.O. Box 8331 Chicago, IL 60680-8331
(312) 271-1020

CIRCLE 840 ON READER SERVICE CARD

OPT-TECH SORT/MERGE

High Performance Sort/Merge/Select utility. Run as a standalone utility or call as a subroutine. Supports most languages and filetypes. Unlimited file size, multiple keys and much more! MS-DOS, Windows \$149. OS/2, Unix \$249.

Opt-Tech Data Processing

P.O. Box 678 - Zephyr Cove, NV 89448
(702) 588-3737 Fax: (702) 588-7576

CIRCLE 846 ON READER SERVICE CARD

MEDICAL

SAVE UP TO 20% ON POSTAGE

Print postal bar codes on envelopes, labels, letters and cards with Word for Windows, Ami Pro or Word-Perfect for Windows and your existing dot matrix or laser printer. • WIN 3.1 or 3.0 with ATM required. • \$99. • VISA/MC • 30 days Money Back.

Innovage

21436 NE Union Hill Road, Redmond, WA 98053
Phone: 206-462-5787 Fax: 206-868-5482

CIRCLE 835 ON READER SERVICE CARD

PRACTICE BILLING

MD VersaForm, flexible, ledger based design, billing package. Programmable; customizable reports, files, & screens; includes database mgmt system & full source. ECS. LAN support. \$1,295 sg/ user. Free lit & demo. Dirs wanted.

Applied Software Technology

591 W. Hamilton Ave., Ste 201, Dept. 99
Campbell, CA 95008 (800) 678-1111 Ext. 99

REAL ESTATE

Property Management

Software for managing residential, commercial, condos, etc. Basic version for owner/manager- \$495, Deluxe for professional managers- \$1,195, Network- \$2,395. Includes check writing, recurring expenses, G/L, management reporting.

YARDI SYSTEMS, INC.

819 Reddick Street, Santa Barbara, CA 93103
(805) 966-3666

CIRCLE 847 ON READER SERVICE CARD

MAINTENANCE/PREVENTIVE MAINTENANCE

FLEET/EQUIP MAINTENANCE

A preventative maintenance & report system for vehicles/equip that need periodic service. Some features: Scheduled service reports, Service history, Full operating cost reports, User defined codes, Cost per mile/hour reports.

Ram Systems, Inc.

224 Causeway Blvd., La Crosse, WI 54603
(608) 782-8130 FAX: (608) 784-5115

CIRCLE 838 ON READER SERVICE CARD

MediSoft Advanced v3.5 \$475

Full featured Practice Mgt. Software • Patient Data, Ins. aging, line item pymt. reports & more! • New HGFA-1500, Elect. billg., Calc. Appt. bk., dialer. • Call for special pricing on our Computer Systems. • Tel. training & support/Auth. Preferred Dealer.

American Medical Computers

197 Durham Ave, Metuchen, NJ 08840
T (908) 549-3935 F (908) 549-6098

CIRCLE 842 ON READER SERVICE CARD

Property Management

With Rental-Ease save \$\$ on your investment! Guaranteed to be the easiest & fastest property management system available at any price. Versions for owners, professionals, networks. \$395 to \$1295. Demo \$10. Dealers welcome!

Strategic Office Systems

688 N. 500 W. #61, Mt. Pleasant, UT 84647
(800) 942-6784 or (801) 462-2130

CIRCLE 848 ON READER SERVICE CARD

REDUCE Maint/Energy/Utility Costs!

Does EVERYTHING! Just the way you want it! Prev/Pred Maint, Energy/Utilities Tracking & Conservation, Rate Analysis! All in same DB. Written in "C". In business since 1975. QUALIFIED REPS NEEDED IN SOME AREAS

GENERAL ENERGY TECHNOLOGIES

250 E. 17th St., Costa Mesa, CA 92627
714-645-7733 714-645-7747 Fax

CIRCLE 837 ON READER SERVICE CARD

Advanced Practice Management

Features include patient & insurance billing, electronic claims, scheduling, report writer, graphics, keyboard macros, mouse support, and much much MORE!
\$199-30 Day Money Back Guarantee

Lytec Systems, Inc.

6975 Union Park Center, Suite 270
Salt Lake City, UT 84047 1-800-735-1991

CIRCLE 843 ON READER SERVICE CARD

The Landlord® & The Landmaster®

Property management software purchased by more than 5,000 owners and property managers since 1980. Handles residential and commercial tenant accounting; prints checks and statements. G/L and A/P included. From \$595 to \$2200.

The Landlord Software Center

427 East Patrick Street, Dept. E
Frederick, MD 21701 (301) 695-1544

CIRCLE 849 ON READER SERVICE CARD

PROGRAMMERS TOOLS

MAINTENANCE MANAGEMENT

PC-based system for the small to medium size business. FEATURES: Work Orders (space for detail instructions & safe work procedures), equipment descriptions, historical data, operating & analytical reports, inventory. Free Demo !!

PENGUIN COMPUTER CONSULTANTS

P.O. Box 20485, San Jose, CA 95160
(408) 997-7703 FAX: (408) 927-0570

CIRCLE 836 ON READER SERVICE CARD

BASIC PROGRAMMING TOOLS

Crescent offers many tools for QuickBASIC, PDS, and Visual Basic, all with tutorials and full source. Assembly routines, graphics, screen design w/data entry, BASIC TSR's, and much more. No royalties. Call or write for our catalog.

CRESCENT SOFTWARE, INC.

11 Bailey Avenue, Ridgefield, CT 06877
Orders: 800-35-BASIC, Tech: 203-438-5300

SALES/MARKETING

SALES ALLY Software

• PC Magazine Editors' Choice • PC Computing "Best Product" • Mobile Office Mag Annual Award Client & Prospect Management Database, Wordprocessor, & Notepad Autodialing, Reports, Alarms Invoicing, Sales Forecasting, Networks

SCHERRER RESOURCES, INC.

8100 Cherokee Street Philadelphia, PA 19118
215-836-1830, \$395, (Visa/MC/Amex)

CIRCLE 850 ON READER SERVICE CARD

MANUFACTURING

Over 3000 Satisfied Users!

Mfg. inventory control, multi-level BOMs, and integrated purchasing. BOM-driven transfers with full explosion/implosion. \$1495 with money-back guarantee. Informative demo disk prints sample reports - just \$5 (V/M/A accepted).

Microcomputer Specialists, Inc.

P.O. Box 795, Woodstock, Vermont 05091
Call toll free 1-800-833-1500

CIRCLE 839 ON READER SERVICE CARD

Visual Basic Database Tools

NEW!! Visual/db Source Code Database adds real DBMS power to your Visual Basic programs. Reads and writes dBASE III/IV DBF and NDX files. Includes 6 ready-to-run data management programs. Regular \$149; Intro Price only \$119.

AJS Publishing, Inc.

P.O. Box 83220, Los Angeles, CA 90083
(800) 992-3383 (310) 215-9145

mSOFT® - Triple Your Sales!

Salespeople/AE Tracking • Contact Mgt • RFQ • Std & Custom Quotes • Orders • Pricing • Forecasting • Auto Dial • Letters • Scheduling • Labels • Report Writer • Calculator • Calendar • Notes • Import Files • Single & Multi-LAN • Source Code • FREE Demo

RAVIS Software, Inc.

PO Box 232 Madison NJ 07940
201-455-0228 or 201-301-0566

CIRCLE 851 ON READER SERVICE CARD

SCIENTIFIC

Scientific SW - FREE CATALOG

A great selection of scientific software products for plotting, non-linear curve fitting, chemical equilibrium calculations, simulation, statistics, differential equations, symbolic algebra, and more.

MicroMath Scientific Software

Box 21550, Salt Lake City, UT 84121-0550
1-800-942-6284 FAX (801)943-0299

CIRCLE 852 ON READER SERVICE CARD

STATISTICS

NCSS 5.x Series - \$125

"Best value & easiest to learn/use" PC-Week. Menus/Spreadsheet. Means, etc. Regression, t-tests, ANOVA, Factor, cluster & discriminant. Cross tabs. Nonparametrics. Histograms. Plots. Reads ASCII/Lotus. Many extra modules.

NCSS

329 North 1000 East, Kaysville, UT 84037
Phone: 801-546-0445 FAX: 801-546-3907

CIRCLE 853 ON READER SERVICE CARD

SURVEYS

Spreadsheet Statistics - \$25

Comprehensive statistics and forecasting modules for analyzing LOTUS worksheets. Fast. Convenient. Easy to use. Includes tutorial. Ideal for vertical markets. Guaranteed best buy. Free brochure.

StatPac Inc.

3814 Lyndale Ave. S., Mpls., MN 55409
Tel: (612) 822-8252 Fax: (612) 822-1708

CIRCLE 854 ON READER SERVICE CARD

The Survey System

Analyzes market research, public opinion, customer satisfaction and employee attitude surveys. Easy to learn and use. Produces presentation quality tables and graphics. Statistics, verbatim, interviewing and network options.

Creative Research Systems

15 Lone Oak Ctr. - Dept. P, Petaluma, CA 94952
Ph: (707)765-1001 Fax: (707)765-1068

Survey Sald™ for Windows

Introducing an incredible software package for administering surveys. Harness the power of windows for the most powerful, flexible and portable survey package available today. It's easy, just point & click. Introductory price \$399.

Marketing Masters

2168 Birch Creek Rd. DePere, WI. 54115
(414) 337-1964

CIRCLE 856 ON READER SERVICE CARD

WINDOWS

Pinpoint PC Bottlenecks

- Personal Measure shows how apps spend time.
- Upgrade or replace PCs based on hard facts.
- Identify network trouble spots.
- Resolve app problems using our services.
- \$125 + S&H (5.25" or 3.5") MC/VISA

SPIRIT OF PERFORMANCE, INC.

73 Westcott Road, Harvard, MA 01451
tel. 508/456-3889, telex 6503571400

CIRCLE 857 ON READER SERVICE CARD

New Personal Database Software!

Easy Data for Windows is fast & simple to use. Very intuitive & complete. Get started in 5 minutes or less. Full Guarantee & 30 Day Money Back policy. \$59+\$4s/h. V/MC/AX. We're just a toll free call away!

LAKEVIEW SOFTWARE CORP.

8377 Cherry Lane, Laurel, MD 20707
1-800-669-4315 • 301-317-0726/Fax:0587

CIRCLE 858 ON READER SERVICE CARD

Free WAV Files!

SoundWAV randomly changes Win 3.1 system sounds at Start Up. Only \$45. Includes 10 MB of free samples: HAL, Darth Vader, #5, Bogart, Robocop, Nixon, Dirty Harry, sound FX, HUNDREDS more! All Hi-Fi, recorded in WAV format.

NEW EDEN MULTIMEDIA

7652 Hampshire Ave, Minneapolis, MN 55432
(612) 561-2557

CIRCLE 859 ON READER SERVICE CARD

MISCELLANEOUS/BAR CODING

Labeling & Barcoding Software

WYSIWYG design/Built-in data base w/file import/ Scalable fonts / Many barcodes / Variable code densities, ratios, heights / Batch printing / PCX image support / Dot matrix, laser, thermal printers / \$259 and up.

LabelSoft™

P.O. Box 488, Perrysburg, OH 43552
(419) 874-8502 FAX (419) 874-9313

CIRCLE 860 ON READER SERVICE CARD

BAR CODE LABELER

Menu driven program prints Code39, 12x5 Codabar, 128A,B,C, all auto. UPC-A/E, EAN-8/13 & add-ons, DUN-14/16. Avery laser label data supplied. You specify height, resolution. Prints functional, low cost bar code labels! \$99.00.

SJ Programs

1127 S.Patrick Dr.S.18 Satellite Beach, FL 32937
Tel. 407-773-8020 Fax. 407-773-0457

CIRCLE 861 ON READER SERVICE CARD

BUSINESS OPPORTUNITIES

\$ EARN PROFITS UP TO 300% \$

STARTING TODAY. Be your own boss. We are the original ... and clearly the best business opportunity offering satisfaction, flexibility and high profit potential.

***** CALL FOR OUR FREE VIDEO*****

Academic Guidance Services, Inc.

15000R Commerce Parkway, Dept. PC
Mt. Laurel, NJ 08054 1-800-544-7100

CIRCLE 862 ON READER SERVICE CARD

DATA CONVERSION

Move HP Data + Programs to PC's

Read Hewlett Packard ASCII, Binary data files on IBM PC and compatibles. Translate Hewlett Packard Basic programs to run in Microsoft C on your PC. Call for demo, data sheet, catalog.

Oswego Software

P.O. Box 310, Oswego, IL 60543
708-554-3567 FAX 708-554-3573

CIRCLE 863 ON READER SERVICE CARD

ON-LINE SERVICES

THE BEST BBS IN THE WORLD!

Decide for yourself. Use your modem to gain access to over 40,000 downloadable files, E-mail network, online games and much more. * FREE files for first time callers. Hundreds of new programs each week. NO HOURLY ONLINE FEES!

THE INVENTION FACTORY INC.

BY MODEM CALL (212)431-1194 @ N-8-1
VOICE/FAX (212)431-5555

CIRCLE 864 ON READER SERVICE CARD

ORIGINAL ARTWORK ONLINE!

- Original artists & graphic images incl. adult
- Large Windows™ download category
- Only 25 dollars per year membership
- Member ASP - quality software only
- National mail conferences and classified ads

Classified Computing/Gifty Ent. BBS

9528 Miramar Rd. Ste 277, San Diego, CA 92126
(619) 566-7347 / (619) 566-0361 USR HST DS

CIRCLE 865 ON READER SERVICE CARD

H-E-L-P!! CALL NOW!

All questions answered for IBM Compatible PC Users. Techs on duty 9am-Midnight EST. BONUS-Free newsletter with call. Software, Hardware and small business applications. \$12.50 1st min. .95 each additional min.. VISA, MC.

Personal Computer Services, Inc.

2245 W. Great Neck Road Ste 6
Virginia Beach, VA 23451 (800) 283-4913

CIRCLE 866 ON READER SERVICE CARD

SERVICES

GRAPHICS SCANNING SERVICE

Any LOGO/ART CONVERTED to graphics image! Send camera ready art or clear crisp copy. Choose WordPerfect, TIFF or PCX format & DS/DD disk size (5.25or3.5). WP5.1 Letterhead/Envelope Macro & S/H INCLUDED! Send \$25.00 per image:

SCANIT

5405 Alton Parkway, Suite 54441
Irvine, CA 92714 714/276-2593

CIRCLE 867 ON READER SERVICE CARD

GET CONSULTING EXPERTISE!

- Full WINDOWS application development
- Relational database application development
- LAN installation and support
- COBOL application development & customization
- On-line advice and programmer assistance

ConsultDIRECT, Inc.

2840 Alta Terrace, La Crescenta, CA 91214
Call 818-248-1000

CIRCLE 868 ON READER SERVICE CARD

SUPPLIES

COMPUTER BATTERIES

Nickel Cadmium, Lithium, Lead Acid & Alkaline Batteries for P.C. Boards, UPS, Printers & Laptop Computers. Custom Build Battery Packs. MC/V

EVS SUPPLY

1350 Arapaho #126, Richardson, TX 75081
1-800-776-5267 FAX 214-231-2269

CIRCLE 869 ON READER SERVICE CARD

DISPLAY ADVERTISING

**Ted Welch - Associate
Publisher/West Coast**
(415) 378-5525

**Nancy Newman -
Associate Publisher- East Coast/
National Advertising Director**
(212) 503-5204

**Robert Dittler - Central
Advertising Manager**
(312) 346-7666

**Anna Zornosa -
Associate Publisher/
Networking**
(212) 503-5310

Sales Manager
Michael Hatherill
(212) 503-5128

Ad Systems Supervisor
Allyson Deane
(212) 503-5044

Sr. Advertising Coordinator
Christine Holsten
(212) 503-5264

Advertising Coordinator
Lynette Stiffa
(212) 503-5107

EASTERN

MA, NH, VT, ME, RI

District Sales Manager
Kimberly Rene White
10 President's Landing, Mystic
Central
Medford, MA 02155
(617) 393-3055

Account Representative
Ira Becker
(212) 503-5132

CT, NY, NJ, PA

District Sales Manager
Michael Bird
One Park Avenue, 4th Floor
New York, NY 10016
(212) 503-5307

District Sales Manager
Lisa Friedman
(212) 503-5149

Sr. Account Representative
Karen Keavey
(212) 503-5333

Sr. Account Representative
Stephanie Brzozowski
(212) 503-5675

**DE, MD, DC, VA, WV, NC, SC, AL,
MS, TN, AR, KY, GA, FL**

District Manager
Scott J. Seltz
3405 Piedmont Road, Suite 460
Atlanta, GA 30305
(404) 239-9780

Account Representative
Andrew Jacobs
(212) 503-5130

CENTRAL

**NE, WI, IL, IN, KS, MN, MO, OH,
MI, IA, ND, SD, Canada**

District Sales Manager
Stephen Dress
150 North Wacker Drive, 25th Floor
Chicago, IL 60606
(312) 346-7666

District Sales Manager
Jay Overbye
(312) 346-7666

Account Representative
Maureen Dooley
(212) 503-5126

Sr. Account Representative
Beth Boyle
(212) 503-5047

TX, OK, LA, NM

District Sales Manager
Paul Klein
5956 Sherry Lane, Suite 625
Dallas, TX 75225
(214) 691-6934

Account Representative
(212) 503-5104

WESTERN

**CA (San Diego & Orange County),
AZ, NV, HI**

District Sales Manager
David Lynn
18500 Von Karman Avenue, Suite 510
Irvine, CA 92715
(714) 852-8001

District Sales Manager
Robin Kofsky
(714) 852-8001

Sr. Account Representative
Molly Shank
(212) 503-5113

WESTERN

CA (Los Angeles)

District Sales Manager
Mary Arlotto (213) 351-1811
3530 Wilshire Boulevard, Suite 645
Los Angeles, CA 90010
(213) 351-1810

Account Representative
Elizabeth O'Connor
(212) 503-5040

CA (San Jose)

District Sales Manager
Michael Klein (415) 378-5521
110 Marsh Drive, Suite 103
Foster City, CA 94404
(415) 378-5520

Account Representative
John De Spirito
(212) 503-5041

**Mike Kisseberth - Northwest
Advertising Manager**
(415) 378-5527

**CA (San Francisco & North), ID,
OR, WA**

District Sales Representative
Todd Anderman
110 Marsh Drive, Suite 103
Foster City, CA 94404
(415) 378-5520

District Sales Representative
Rick Vandervoom
(415) 378-5523

Account Representative
Mike Medwig
(212) 503-5129

**CA (South San Francisco to
Mountainview), CO, UT, WY, AK**

District Manager
Kim Dawson
(415) 378-6859

Account Representative
John De Spirito
(212) 503-5041

For more information regarding *display advertising*
please call: (212) 503-5100 or 1-800-33MAG AD

CLASSIFIED ADVERTISING

VP, Classified Advertising
Paul Stafford
Classified Advertising Director
Vickie L. Pinsky
Sr. Advertising Coordinator
Wanda D. Brown
Production Director
Anne Brockinton
Production Supervisor
Bessi Dion

CA (408, 415, 510)
Sr. Account Representative
Charles Boyar
212-503-5118
**CA (209, 707, 916), CO, ID, MO, NV,
OR, UT, WA, WY**
Sr. Account Representative
Kathleen Morris
212-503-5125
**AK, IA, IL, IN, KS, MI, MN, MO, ND,
NE, SD, WI, CANADA, OVERSEAS**
Margaret Kennelly
212-503-5176

**CT, MA, ME, NH, NJ, NY, OH, PA, RI,
VT**
Mark Mathewson
212-503-5193
AZ, AR, CA, (619, 805), LA, NM, OK, TX
Jason Weiskopf
212-503-5193
CA (213, 408), HI
212-503-5156
**AL, DC, DE, KY, LA, MD, MS, OK, TN,
TX, VA, WV**
Heidi Wooden
212-503-5117

Business Card
Account Representative
Richard Wortman 212-503-5175



PC MAGAZINE MARKETPLACE
3rd Floor, One Park Avenue,
New York, NY 10016
For more information
regarding *classified*
advertising please call:
212-503-5115 or
1-800-825-4237

ADVERTISERS' INDEX COMPANIES

R/S#	ADVERTISER	PAGE	R/S#	ADVERTISER	PAGE	R/S#	ADVERTISER	PAGE
293	3 Com	282-283	284	EPS Technologies	168-169	*	PC Connection	268-273
167	3M Data Storage Products	202	*	Epson	6-7	*	PC Zones	250-253
034	Acer America Corporation	65	032	FASTMICRO	83-85	016	PCs and More	428
360	Acma Computers, Inc.	16	352	FASTMICRO	414-415	092	PCs Compleat	429-431
*	America On-Line	423-424	288	Fifth Generation	147	358	Peachtree Software	89
*	Apple Computer	354-357	382/320	First Source International	425	327	Platinum Desktop Software	255
208	APS Technologies	436	112	Fox Software	228-229	383	Primavera Systems	58
336	Arlington Computer Products	426	*	Gateway 2000	129-140	141	QMS	41
254	Artisoft	191	*	Hard Drives International	433	338	Quarterdeck Office Systems	45
008	ASP Computer Products	88	073	Hewlett Packard New Wave	86	321	RealWorld Corp.	82
337	ATI Technologies Inc.	325	*	Hewlett Packard Peripheral Group	285-290	290	Rose Electronics	73
227	Atlantic Computer	123	024	IBM Corporation	78-79	296	SAMTRON	294
012	Austin Computers	11-15	044	ICOM Simulations	100	*	Seagate	112
042	Autodesk Retail Products	61-63	*	In Focus Systems, Inc.	124	*	Seiko Instruments-PC Products	321
129	Avery Dennison	365	*	Insight Computers	416-417	160	Sigma Data	279
295	Borland International	51	192	Integrated Information Tech	47	082	SOFTEQ Computers	422
287	Borland International	53	374	Intel Corporation	204-205	*	Software Publishing	70
285	Borland International	55	*	Intuit Software	96-97	*	Software Publishing	188-189
328	Buffalo Products	425	325	IQ Engineering	18	203	Software Spectrum	126
015	Bulldog Computer Products	418	106	Kingston Technology Corp.	277	068	Software Spectrum	366
181	Bureau of Electronic Publishing	489	370	Kyocera Electronics	328	178	Spectrum HoloByte	100
053	Calera Recognition Systems	345	019	LA Trade	408	061	Stac Electronics	19
190	CallSoft	101	309	LANtek Computer, Inc.	413	163	Standard Computer	68-69
155	Canon, USA	343	237	Lasermaster	72	365	STSC	43
079	Central Point Software	57	*	Lexmark International	144-145	191	Supra Corporation	210
138	Certus International	178-179	131	Logical Connection	370	*	Swan Technologies	193-196
026	Colorado Memory Systems, Inc.	180	182	Logitech	302-303	344	Symantec	28
*	CompuAdd Express	121	*	Lotus Development Corp.	108-111	*	Tangent Computer, Inc.	411
*	CompuAdd Express	307-314	*	Lotus Development Corp.	110-111	001	Tektronix	280
205	Compuclassics	438-439	263	Macola Inc.	222	206	Telemart	74-75
132	COMPUDYNE	183-186	067	MAG Innovision	166	306	Tenex Computer Express	422
300	Computability	437	291	Map Info Corp.	219	353	Texas Instruments	172
381	Computer Associates	236-237	154	MathSoft Inc.	301	304	Texas Instruments	239
109	Computer Discount Warehouse	419-421	093	Media Vision	164	379	Toshiba America	246-247
*	Computer Library	160	020	MicroComputer Accessories	76	121	Tri-Star Computer	20-21
158	Computer Library	358	361	Micrografx	217	140	ULSI Systems, Inc.	241
009	Computer Library	384-385	*	Microsoft	2-3	367	Universal Data Systems	370
105	Computer Peripherals Inc.	23	*	Microsoft	156-159	189	USA Flex	434-435
185	CONNEXPERTS	125	*	Microsoft	206	090	V-Com	104-105
011	Corel Systems	94	*	Microsoft	225	003	Western Digital	368
177	Corel Systems	364	*	Microsoft	227	180	Wolfram Research, Inc.	148
086	Creative Labs, Inc.	67	*	Microsoft	346-347	*	WordPerfect	118-119
278	Crosstalk	22	013	MicroTac Software	293	211	Xircom	106
022	DAC Easy, Inc.	249	225	MicroWarehouse Inc.	212-215	271	Zenith Data Systems	208-209
298	Data Products	80	010	Midwest Computer Works	410	035	Zeos International	24-25
171	Datasouth Computer Corp.	152	280	Mitsubishi Electronics	5	060	Zeos International	26-27
142	DataViz	175	108	Multi Tech Systems	98	036	Zeos International	33
389	DCA	154-155	242	NCR Corporation	102-103	065	Zeos International	34-35
030	Dell Computer Corporation	C5-C8	153	NEC Technologies, Inc.	C2-C4, p1	*	Zeos International	48A-48L
029	Dell Computer Corporation	149-151	157	NEC Technologies, Inc.	242-243	151	Zeos International	90-91
*	Dell Computer Corporation	491-492	217	NEC Technologies, Inc.	260-261	038/115	Zeos International	92
*	Desktop Direct From Digital	331-338	156	NEC Technologies, Inc.	361	063	Zeos International	162-163
125	DH Systems	412	*	Northgate Computer Systems	201	*	Zeos International	177
188	Digicom Systems Inc.	4	*	Northgate Computer Systems	317-319	069	ZiffNet Information Services	220
002	Digital Products	200	*	On Track Computer Systems	221	074	ZiffNet Information Services	327
150	Dresselhaus Computer Products	393	*	Pacific Data Products	36	085	ZiffNet Information Services	379
102	DTK Computers	374	*	Pacific Data Products	142			
017	Dustin Discount Software	406	145	Pacific Wave (Paradise)	427			
027	Dustin Discount Software	409	*	PC Brand	231-234			

* No Reader Service #. Please Call Advertiser For Information.

ADVERTISERS' INDEX

PRODUCTS BY CATEGORY

R/S# ADVERTISER

PRODUCT

PAGE#

R/S# ADVERTISER

PRODUCT

PAGE#

ACCOUNTING SOFTWARE

381	Computer Associates
022	DAC Easy, Inc.
*	Intuit Software
263	Macola Inc.
358	Peachtree Software
327	Platinum Desktop Software
327	Platinum Holdings Corp.
321	RealWorld Corp.

DATA BASE MANAGERS

295	Borland International
190	CalSoft
009	Computer Library
112	Fox Software
*	Software Publishing

FILE TRANSLATION SOFTWARE

142	DataViz
-----	---------

LANGUAGES

285	Borland International
-----	-----------------------

OPERATING SYSTEMS/ENVIRONMENTS

*	Microsoft
068	Software Spectrum

PROJECT MANAGEMENT

*	Microsoft
363	Primavera Systems

STATISTICAL SOFTWARE

154	MathSoft Inc.
385	STSC
180	Wolfram Research, Inc.

UTILITIES

129	Avery Dennison
079	Central Point Software
073	Hewlett Packard New Wave
044	ICOM Simulations
*	On Track Computer Systems

WORD PROCESSING SOFTWARE/AIDS

190	CalSoft
*	Microsoft
203	Software Spectrum
*	WordPerfect

CAD/CAM

042	Autodesk Retail Products
-----	--------------------------

SPREADSHEET/TEMPLATES

287	Borland International
*	Lotus Development Corp.
*	Microsoft
068	Software Spectrum

FOREIGN SOFTWARE

013	MicroTac Software
-----	-------------------

VERTICAL MARKET SOFTWARE

154	MathSoft Inc.
061	Stac Electronics

EDUCATIONAL SOFTWARE

027	Dustin Discount Software
-----	--------------------------

ENTERTAINMENT SOFTWARE

044	ICOM Simulations
178	Spectrum HoloByte

FONT SOFTWARE

105	Computer Peripherals Inc.
-----	---------------------------

PRESENTATION SOFTWARE

203	Software Spectrum
-----	-------------------

MAPPING SOFTWARE

027	Dustin Discount Software
291	Map Info Corp.

WINDOWS SOFTWARE

190	CalSoft
073	Hewlett Packard New Wave
044	ICOM Simulations
*	Lotus Development Corp.
*	Lotus Development Corp.
263	Macola Inc.
291	Map Info Corp.
154	MathSoft Inc.
361	Micrograph
*	Microsoft
*	Microsoft
*	Microsoft
*	Microsoft
358	Peachtree Software
*	Software Publishing
203	Software Spectrum
203	Software Spectrum
068	Software Spectrum
068	Software Spectrum
180	Wolfram Research, Inc.

AccPac Plus	236-237
DacEasy Accounting	249
QuickBooks & QuickPay	96-97
Accounting Software	222
Accounting for Windows	89
Access To Platinum	255
Platinum	255
Accounting Software	82

DBase	51
-------	----

Data Base Managers Software	101
-----------------------------	-----

Support On Site	384-385
-----------------	---------

Database Manager, Fox Pro 2.0	228-229
-------------------------------	---------

SuperBase	70
-----------	----

MacLinkPlus/PC	175
----------------	-----

BC++	55
------	----

Windows 3.1	156-159
-------------	---------

Windows 3.1	366
-------------	-----

Project for Windows	206
---------------------	-----

Suretrak Project Scheduler	58
----------------------------	----

MathCad 3.0	301
-------------	-----

Statgraphics	43
--------------	----

Mathematical Software	148
-----------------------	-----

Label Pro Software	365
--------------------	-----

PC Tools	57
----------	----

New Wave for Windows	86
----------------------	----

Windows Screen Saver	100
----------------------	-----

Data Organization Software	221
----------------------------	-----

Word Processing Software	101
--------------------------	-----

Word for Windows	346-347
------------------	---------

Ami Pro 2.0/RIGHTwriter	126
-------------------------	-----

WordPerfect for Windows	118-119
-------------------------	---------

AutoCAD	61-63
---------	-------

Quattro Pro IV	53
----------------	----

Lotus 1-2-3 for Windows	108-109
-------------------------	---------

Win Excel	2-3
-----------	-----

Excel 4.0 for Windows	366
-----------------------	-----

Spanish Assistant	293
-------------------	-----

MathCad 3.0	301
-------------	-----

Stacker	19
---------	----

AutoMap, BodyWorks, Orbits	408
----------------------------	-----

Windows Screen Saver	100
----------------------	-----

WORDTRIS	100
----------	-----

SuperSet Font Cartridge	23
-------------------------	----

Freelance Graphics for Windows	126
--------------------------------	-----

AutoMap, BodyWorks, Orbits	408
----------------------------	-----

Mapping Software	219
------------------	-----

Windows Software	101
------------------	-----

New Wave for Windows	86
----------------------	----

Windows Screen Saver	100
----------------------	-----

Lotus 1-2-3 for Windows	108-109
-------------------------	---------

cc:Mail	110-111
---------	---------

Windows Software	222
------------------	-----

Mapping Software	219
------------------	-----

MathCad 3.0	301
-------------	-----

Picture Publisher	217
-------------------	-----

Win Excel	2-3
-----------	-----

Windows 3.1	156-159
-------------	---------

Project for Windows	206
---------------------	-----

Word for Windows	346-347
------------------	---------

Accounting for Windows	89
------------------------	----

Harvard Graphics for Windows	188-189
------------------------------	---------

Freelance Graphics for Windows	126
--------------------------------	-----

Ami Pro 2.0/RIGHTwriter	126
-------------------------	-----

Excel 4.0 for Windows	366
-----------------------	-----

Windows 3.1	366
-------------	-----

Mathematical Software	148
-----------------------	-----

POINT OF SALE SOFTWARE

022	DAC Easy, Inc.
-----	----------------

DATA COMPRESSION SOFTWARE

*	On Track Computer Systems
061	Stac Electronics

ANTI-VIRUS SOFTWARE

138	Certus International
288	Fifth Generation

IMAGE EDITING SOFTWARE

361	Micrograph
-----	------------

DISK BACKUP & TAPE DRIVES

167	3M Data Storage Products
026	Colorado Memory Systems, Inc.
*	Seagate

HARD DISKS

011	Corel Systems
061	Stac Electronics

COMPUTERS COMPATIBLES

034	Acer America Corporation
360	Acma Computers, Inc.
336	Arlington Computer Products
227	Atlantic Computer
012	Austin Computers
015	Bulldog Computer Products
*	CompuAdd Express
*	CompuAdd Express
132	COMPU-DYNE
109	Computer Discount Warehouse
030	Dell Computer Corporation
029	Dell Computer Corporation
*	Dell Computer Corporation
*	Desktop Direct From Digital
102	DTK Computers
284	EPS Technologies
032	FASTMICRO
352	FASTMICRO
*	Gateway 2000
024	IBM Corporation
*	Insight Computers
309	LANtek Computer, Inc.
010	Midwest Computer Works
157	NEC Technologies, Inc.
*	Northgate Computer Systems
*	Northgate Computer Systems
145	Pacific Wave (Paradise)
*	PC Brand
*	PC Zones
092	PCs Complete
082	SOFTCO Computers
163	Standard Computer
*	Swan Technologies
*	Tangent Computer, Inc.
206	Telemart
306	Tenex Computer Express
379	Toshiba America
121	Tri-Star Computer
189	USA Flex
090	V-Com
271	Zenith Data Systems
035	Zeos International
060	Zeos International
036	Zeos International
065	Zeos International
*	Zeos International
151	Zeos International
038/115	Zeos International
063	Zeos International
*	Zeos International

INPUT DEVICES

182	Logitech
*	Microsoft
*	Microsoft

MULTIFUNCTION BOARDS

086	Creative Labs, Inc.
-----	---------------------

ADD-ON BOARDS

208	APS Technologies
086	Creative Labs, Inc.
019	LA Trade
237	LaserMaster
093	Media Vision
180	Sigma Data

PRINTERS

008	ASP Computer Products
155	Canon, USA

DacEasy Point of Sale	249
-----------------------	-----

Data Organization Software	221
----------------------------	-----

Stacker	19
---------	----

Virus Protection Software	178-179
---------------------------	---------

Untouchable	147
-------------	-----

Picture Publisher	217
-------------------	-----

Data Storage Products	202
-----------------------	-----

Jumbo Tape Back-Up	180
--------------------	-----

Disk Drive	112
------------	-----

Corel Draw on CD-ROM	94
----------------------	----

Stacker	19
---------	----

PCs	65
-----	----

Acma PC's	16
-----------	----

Mail Order	426
------------	-----

Compatibles	123
-------------	-----

PCs	11-15
-----	-------

Compatibles	418
-------------	-----

Compuadd Express Systems	121
--------------------------	-----

Compuadd Express Systems	307-314
--------------------------	---------

Notebook and Desktop PC's	183-186
---------------------------	---------

Hardware/Software/Peripherals	419-421
-------------------------------	---------

Dell Compatibles, Notebooks	C5-C8
-----------------------------	-------

Dell Compatibles	149-151
------------------	---------

Dell Compatibles	491-492
------------------	---------

PCs	331-338
-----	---------

Computers, Compatibles	374
------------------------	-----

Compatibles, Mail Order	168-169
-------------------------	---------

PCs	83-85
-----	-------

PCs	414-415
-----	---------

PCs, Mail Order, Hardware	129-140
---------------------------	---------

PS/2	78-79
------	-------

Computers, Compatibles	416-417
------------------------	---------

Compatibles, PCs	413
------------------	-----

PCs	410
-----	-----

PCs - 386i	242-243
------------	---------

Compatibles, Mail Order	201
-------------------------	-----

Compatibles, Mail Order	317-319
-------------------------	---------

Mail Order	427
------------	-----

PC's	231-234
------	---------

Compatibles	250-253
-------------	---------

PCs	429-431
-----	---------

PC's	422
------	-----

PCs	68-69
-----	-------

Swan PCs	193-196
----------	---------

PC Compatibles	411
----------------	-----

PCs, Compatibles	74-75
------------------	-------

ADVERTISERS' INDEX

PRODUCTS BY CATEGORY

R/S#	ADVERTISER	PRODUCT	PAGE#	R/S#	ADVERTISER	PRODUCT	PAGE#
298	Data Products	Printers	80		GRAPHICS SOFTWARE		
171	Datasouth Computer Corp	Printers	152	190	CallSoft	Graphic Software	101
002	Digital Products	Print Director	200		Corel Systems	Corel Draw	364
*	Epson	Dot Matrix Printers	6-7	361	Micrograb	Picture Publisher	217
*	Hewlett Packard Peripheral Group	HP LaserJet Printer	285-290		Software Publishing	Harvard Graphics for Windows	188-189
370	Kyocera Electronics	Printers	328		PLOTTERS CHARTING DEVICES		
237	Lasermaster	Win Jet 800	72	*	Pacific Data Products	ProTracer	36
*	Lexmark International	Laser Printers	144-145		VIDEO GRAPHICS BOARDS		
156	NEC Technologies, Inc	Color PS40	361	337	ATI Technologies Inc.	ATI Graphics Accelerators	325
141	QMS	PS-1700 Network Printer	41	*	In Focus Systems, Inc	In-Focus 1600LC	124
290	Rose Electronics	Printer Sharing Switches	73		PCs and More	Video Boards	428
*	Seiko Instruments-PC Products	Personal ColorPoint Printer	321	016	Swan Technologies	VGA Boards	193-196
001	Tektronix	Printers	280		ACCELERATOR BOARDS		
353	Texas Instruments	MicroLaser	172	003	Western Digital	Paradise Accelerator Board	368
	FONT CARTRIDGES				COMMUNICATIONS SOFTWARE		
325	iQ Engineering	Fonts	18	185	CONNEXPERTS	Connectivity Catalog	125
	WORKSTATIONS			278	Crosstalk	Crosstalk Mark 4	22
*	Desktop Direct From Digital	Workstations	331-338	389	DCA	DCA Family of Products	154-155
	PRINTER ACCESSORIES			*	On Track Computer Systems	Data Organization Software	221
008	ASP Computer Products	ServerJet	88	290	Rose Electronics	Communications Software	73
328	Buffalo Products	Printer Sharing Solutions	425	344	Symantec	PC Anywhere	28
185	CONNEXPERTS	Connectivity Catalog	125		LOCAL AREA NETWORKING		
002	Digital Products	Print Director	200	293	3 Com	Net Builder	282-283
150	Dresselhaus Computer Products	Printer Sharing Devices	393	254	Arisoft	LANtastic	191
*	Hewlett Packard Peripheral Group	HP LaserJet Printer	285-290	008	ASP Computer Products	ServerJet	88
237	Lasermaster	Win Jet 800	72	185	CONNEXPERTS	Connectivity Catalog	125
131	Logical Connection	Logical Printer Sharing	370	389	DCA	DCA Family of Products	154-155
	HIGH RESOLUTION PRINTER BOARDS			002	Digital Products	Print Director	200
237	Lasermaster	Win Jet 800	72	309	LANtek Computer, Inc	ARCNet Ethernet Token Ring	413
	MULTI-MEDIA			309	LANtek Computer, Inc	Novel, Network LANtastic	413
011	Corel Systems	Corel Draw on CD-ROM	94	309	Lotus Development Corp	Link64 T1, Remotes	413
093	Media Vision	Audio Port	164	*	Multi Tech Systems	ccMail	110-111
	PORTABLE LAP COMPUTERS			108	On Track Computer Systems	Multiplexors	98
*	CompuAdd Express	Compuadd Express Systems	307-314	*	PS-1700 Network Printer	Data Organization Software	221
132	COMPUDYNE	Notebook and Desktop PC's	183-186	141	QMS	PS-1700 Network Printer	41
109	Computer Discount Warehouse	Monitors, Laptops, Modems	419-421	290	Rose Electronics	Peripheral Sharing Switch	73
030	Dell Computer Corporation	Dell Compatibles, Notebooks	C5-C8	344	Symantec	PC Anywhere	28
*	Dell Computer Corporation	Dell Compatibles	491-492	367	Universal Data Systems	UDS LanFast	370
*	Desktop Direct From Digital	Notebooks	331-338	211	Xircom	Simplicity Starter Pak	106
284	EPS Technologies	Compatibles Mail Order	168-169		MICRO-MAINFRAME LINKS		
*	Insight Computers	Notebooks	416-417	389	DCA	DCA Family of Products	154-155
242	NCR Corporation	Safari Notebook NSX20	102-103		MORE		
217	NEC Technologies, Inc	SL20p	260-261	109	Computer Discount Warehouse	Monitors, Laptops, Modems	420-421
*	Northgate Computer Systems	Compatibles Mail Order	201	188	Digicom Systems Inc	V 32 Bis Scout Modem	4
*	Northgate Computer Systems	Compatibles Mail Order	317-319	108	Multi Tech Systems	Modems	98
*	PC Zones	Laptops	250-253	191	Supra Corporation	V 32 Modem	210
016	PCs and More	Notebooks	193-196	367	Universal Data Systems	UDS LanFast	370
*	Swan Technologies	Win SX Notebook	239		EMULATORS PROTOCOL CONVERTERS		
304	Texas Instruments	T3300SL Notebooks	246-247	*	Pacific Data Products	25 in One! for Desktop	142
379	Toshiba America	Compatibles Notebook	434-435		MULTIUSER SYSTEMS		
189	USA Flex	Laptop PCs	208-209	290	Rose Electronics	Master Switch	73
271	Zenith Data Systems	Zeos Notebook	24-25		PERIPHERAL SHARING DEVICE		
035	Zeos International	Zeos Notebook	26-27	008	ASP Computer Products	ServerJet	88
060	Zeos International	Math Co-Processor	47	328	Buffalo Products	Printer Sharing Solutions	425
	CO-PROCESSORS	Math Co-Processor	241	002	Digital Products	Print Director	200
192	Integrated Information Tech	Wordscan OCR	345	150	Dresselhaus Computer Products	Printer Sharing Devices	393
140	ULSI Systems, Inc	Corel Draw on CD-ROM	94	131	Logical Connection	Logical Printer Sharing	370
	OPTICAL PERIPHERALS	In-Focus 1600LC	124	290	Rose Electronics	Master Switch	73
053	Calera Recognition Systems	Software	250-253		SERVERS		
011	Corel Systems	Memory	425	121	Trn-Star Computer	LAN	20-21
*	In Focus Systems, Inc	Memory	277	121	Trn-Star Computer	Servers	20-21
PC Zones		Memory	408		REMOTE COMPUTING		
	MEMORY	Memory	428	108	Multi Tech Systems	Hubs	98
382-320	First Source International	OEMM-386 6 0	45	344	Symantec	PC Anywhere	28
108	Kingston Technology Corp	Memory Upgrades	279	367	Universal Data Systems	UDS LanFast	370
019	LA Trade	Mail Order Memory Products	422	211	Xircom	Simplicity Starter Pak	106
016	PCs and More	CD-ROM	489		DATA CARTRIDGES FLOPPY DISKS		
338	Quarterdeck Office Systems	Select Demos	160	167	3M Data Storage Products	Data Storage Products	202
160	Sigma Data	Computer Select	358		FURNITURE		
306	Tenex Computer Express	Support On Site	384-385	020	MicroComputer Accessories	Furniture	76
	CD-ROM	Corel Draw on CD-ROM	94		SECURITY		
181	Bureau of Electronic Publishing	486 Chip	204-205	138	Cerbus International	Security Software	178-179
*	Computer Library	Mail Order	436		PC ACCESSORIES		
158	Computer Library	Mass Storage	433	044	ICOM Simulations	Windows Screen Saver	100
009	Computer Library	Monitors, Laptops, Modems	419-421	020	MicroComputer Accessories	Accessories	76
011	Corel Systems	In-Focus 1600LC	124	061	Stac Electronics	Stacker	19
	CHIPS PROCESSORS	High Resolution Monitors	166		MAIL ORDER		
374	Intel Corporation	Monitors	5	380	Acma Computers, Inc.	Acma PC's	16
	MASS STORAGE	MultiSync Monitors	C2-C4, p1	208	APS Technologies	Mail Order	436
208	APS Technologies	Monitors	294	336	Arrington Computer Products	Mail Order	426
*	Hard Drives International	Monitors	193-196	012	Atlantic Computer	Compatibles	123
	DISPLAYS MONITORS TERMINALS			015	Austin Computers	Mail Order	11-15
109	Computer Discount Warehouse			190	Burdig Computer Products	Mail Order Products	418
*	In Focus Systems, Inc				CallSoft	Mail Order, S.W. Hardware Periph	101
067	MAG Innovation						
280	Mitsubishi Electronics						
153	NEC Technologies, Inc						
296	SAMTRON						
*	Swan Technologies						

R/S #	ADVERTISER	PRODUCT	PAGE#
*	CompuAdd Express	Compuadd Express Systems	121
*	CompuAdd Express	Compuadd Express Systems	307-314
205	Compuclassics	Mail Order	438-439
132	COMPUDYNE	Notebook and Desktop PC's	183-186
300	Computability	Mail Order	437
109	Computer Discount Warehouse	Hardware Software/Peripherals	419-421
029	Dell Computer Corporation	Dell Compatibles	149-151
*	Dell Computer Corporation	Dell Compatibles	491-492
*	Desktop Direct From Digital	Mail Order	331-338
125	DH Systems	Mail Order Products	412
017	Dustin Discount Software	Mail Order Products	406
284	EPS Technologies	Compatibles, Mail Order	168-169
032	FASTMICRO	Mail Order	83-85
352	FASTMICRO	Mail Order	414-415
382/320	First Source International	Mail Order	425
*	Gateway 2000	PCs, Mail Order, Hardware	129-140
*	Hard Drives International	Mail Order	433
*	Insight Computers	Mail Order	416-417
019	LA Trade	Mail Order	408
309	LANtek Computer, Inc.	Networking Products	413
225	MicroWarehouse Inc.	Mail Order	212-215
010	Midwest Computer Works	Mail Order	410
*	Northgate Computer Systems	Compatibles, Mail Order	201
*	Northgate Computer Systems	Compatibles, Mail Order	317-319
145	Pacific Wave (Paradise)	Mail Order	427
*	PC Brand	Mail Order	231-234
*	PC Connection	Mail Order	268-273
*	PC Zones	Mail Order	250-253
092	PCs Compleat	PCs	429-431
082	SOFTTEQ Computers	Mail Order	422
163	Standard Computer	Mail Order	68-69
*	Swan Technologies	PC's Hardware, Software, Periph	193-196
*	Tangent Computer, Inc.	Mail Order	411
206	Telemart	Mail Order	74-75
306	Tenex Computer Express	Mail Order Memory Products	422
121	Tri-Star Computer	Mail Order	20-21
189	USA Flex	Compatibles Notebook	434-435
035	Zeos International	Zeos Notebook	24-25
060	Zeos International	Zeos Notebook	26-27
036	Zeos International	Compatibles	33
065	Zeos International	Compatibles	34-35
*	Zeos International	Compatibles	48A-48L
151	Zeos International	Compatibles	90-91
038 115	Zeos International	Compatibles	92
063	Zeos International	Compatibles	162-163
*	Zeos International	Compatibles	177
ON LINE DATABASE			
*	Armenia On-Line	On Line Services	423-424
069	ZiffNet Information Services	ZiffNet	220
074	ZiffNet Information Services	ZiffNet	327
085	ZiffNet Information Services	ZiffNet	379
BOOKS			
185	CONNEXPERTS	Connectivity Catalog	125
RESELLERS			
203	Software Spectrum	Lotus Products	126
068	Software Spectrum	Microsoft Products	366
APPLE PRODUCTS			
*	Apple Computer	Apple Products	354-357
180	Wolfram Research, Inc.	Mathematical Software	148
MISCELLANEOUS			
185	CONNEXPERTS	Connectivity Catalog	125
020	MicroComputer Accessories	Furniture, Accessories	76
DIRECT MARKETING CONNECTION			
*	Armenia On-Line	On Line Services	423-424
008	APS Technologies	Mail Order	436
336	Arlington Computer Products	Mail Order	426
328	Buffalo Products	Printer Sharing Solutions	425
015	Bulldog Computer Products	Mail Order Products	418
205	Compuclassics	Mail Order	438-439
300	Computability	Mail Order	437
125	DH Systems	Mail Order Products	412
017	Dustin Discount Software	Mail Order Products	406
027	Dustin Discount Software	AutoMap, BodyWorks, Orbits	409
352	FASTMICRO	PCs, Mail Order	414-415
382 320	First Source International	Mail Order, Memory	425
*	Hard Drives International	Mail Order, Mass Storage	433
*	Insight Computers	Mail Order	416-417
019	LA Trade	Mail Order, Memory	408
309	LANtek Computer, Inc.	Mail Order	413
010	Midwest Computer Works	Mail Order, PCs	410
145	Pacific Wave (Paradise)	Mail Order	427
016	PCs and More	Video Boards, Memory, Laptops	428
092	PCs Compleat	PCs	429-431
082	SOFTTEQ Computers	Mail Order	422
*	Tangent Computer, Inc.	PC Compatibles, Mail Order	411
306	Tenex Computer Express	Mail Order Memory Products	422
189	USA Flex	Compatibles/Notebook	434-435

For Additional Product Categories See
MARKETPLACE PRODUCT INDEX page 441

■ PC SERVICE AND RELIABILITY

It's easy to build a computer. Developing a support network to keep customers coming back is a far more daunting task. *PC Magazine* surveyed its readers to find out which companies have the best reputations for providing service, building systems with a high degree of reliability, and backing them up with technical support. More than 8,500 subscribers responded to this poll. We report how they rated 36 leading desktop and laptop PC manufacturers.

■ MAGNETO-OPTICAL DRIVES

Although the new 3.5-inch magneto-optical drives still can't beat hard disk access times, their 30- to 60-millisecond rates are good enough for secondary and even primary storage. And with list prices of \$3,000 and under, 3.5-inch MO drives are cheaper than their 5.25-inch predecessors. *PC Magazine Labs* takes a look at eight new 3.5-inch drives to see how they measure up.

■ DATABASE PUBLISHING PACKAGES

For some time now you've had to deal with long and boring lists of names, addresses, prices, numbers, and assorted accumulations of mind-numbing information. Finally, you can liven up all your database input with one of several database publishing packages. *PC Magazine* takes a look at five such offerings, including the new *Ventura Database Publisher*. All of the products allow you to format your once-dull data to your heart's content.

■ DOS WORD PROCESSORS

Still more interested in what you're writing than how it looks? Then you should know that there is life beyond the graphical user interface. We review ten DOS programs that make up in speed and efficiency what they may lack in frills and fanfare. See how the veterans *Microsoft Word*, *WordPerfect*, and *WordStar* stack up against newcomers like *Signature* and lesser-known powerhouses *Nota Bene* and *Textra*. And meet the multilingual *Universal Word*.

■ xBASE: THE STANDARD THAT IMPROVES WITH AGE

dBASE-compatible database management systems, or *xBASE* systems, are the most widely used in the industry today. But which *xBASE* system is right for you? Is a user-friendly development environment a top priority? Or do you need maximum flexibility? We will look at five *xBASE* systems, examining special features, reliability, ease of use, and more, to help you choose the *xBASE* system that's right for you.

■ UTILITIES

Our next issue's utility is *SPRINTER.COM*, a tiny TSR that adds a cursor accelerator feature to your PC. For maximum flexibility, it gives you a variety of Alt, Ctrl, and Shift choices to use as your accelerator key, and it lets you select from among a wide range of cursor speeds. When the accelerator key is held down, the speed-up function is enabled, and the cursor can be moved with the four Arrow keys and the PgUp and PgDn keys.



EDITORIAL PRODUCT INDEX

READER SERVICE NUMBER	PRODUCT	COMPANY	PAGE	READER SERVICE NUMBER	PRODUCT	COMPANY	PAGE	READER SERVICE NUMBER	PRODUCT	COMPANY	PAGE
ACCOUNTING				462	LAN Manager Services for Macintosh, Version 1.0	Microsoft Corp.	211	429	MasterWord	Alki Software	49
477	BusinessVision II, Version 2.5	BusinessVision Management Systems Inc.	248	463	NetWare for Macintosh, Version 3.01	Novell Inc.	216	417	AttTools, Version 1.0	Attitash Software	52
475	ACCPAC Simply Accounting for Windows, Version 1.0c	Computer Associates International Inc.	244	DESKTOP PUBLISHING				433	AutoCAD, Release II, Extension for Windows	Autodesk	38
476	Act 1 Plus, Version 8.2	Cougar Mountain Software	245	458	Microsoft Publisher, Version 1.0	Microsoft Corp.	323	423	Omnis 7, Version 1.0	Blyth Software Inc.	54
480	General Business System	CYMA Systems Inc.	258	457	Express Publisher, Version 2.0	Power Up Software Corp.	322	424	dBASE IV, Version 1.5	Borland International Inc.	46
479	DacEasy Accounting, Version 4.2	DacEasy Inc.	254	459	PagePlus, Version 1.2	Senf Inc.	324	405	PC-File, Version 6.5	Buttonware	59
483	One-Write Plus Accounting Works	Great American Software Inc.	276	460	Publish-It!, Version 2.0	Timeworks Inc.	326	416	Act! for the HP 95LX	Contact Software International Inc.	59
488	Takin' Care of Business, Version 2.0a	Hooper International Inc.	291	456	Avagio, Version 2.0	Unison World Software	302	407	RightFAX, Version 2.0	Cracchiolo & Feder Inc.	59
481	Manage: Complete	Management Information Software Inc.	260	HARDWARE				432	Drafix Windows CAD, Version 2.0	Foresight Resources Corp.	39
484	Pacioli 2000, Version 1.06	M-USA Business Systems Inc.	279	411	Bernoulli PC Powered #9 GXi Lite	Omega Corp. Number Nine Computer Corp.	59 56	420	NewWave, Version 4.0	Hewlett-Packard Co.	44
485	PC Accountant	PC Accountant	281	PLATFORMS				435	MacDraft for Windows, Version 1.0	Innovative Data Design Inc.	39
478	Crystal Accounting, Version 4.0	Peachtree Software	248	490	Apple Macintosh Quadra 700	Apple Computer Inc.	127	404	Network H.Q., Version 2.0	MAGEE Enterprises Inc.	59
487	Peachtree Complete III	Peachtree Software	284	493	Dell PowerLine 450DE	Dell Computer Corp.	167	409	Tempra Show, Version 1.0	Mathematica Inc.	59
474	Access to Platinum, Version 2.5	Platinum Desktop Software Inc.	240	492	NeXTstation Turbo Color	NeXT Computer Inc.	153	428	WOPR 2.0, Version 2.0	Pinecliff International Software Publishing Corp.	49
486	pc.MRP, Version 4.3	Software Arts Consulting	283	491	Sun SPARCstation 2GX	Sun Microsystems Inc.	143	412	InfoAlliance for Windows, Version 1.1	Streetwise Software Corp.	59
489	Teknon Accounting, Version 1.03	Teknon Corp.	292	PRINTERS				410	By Design, Version 2.0	WEB Technologies Inc.	59
482	M.Y.O.B., Version 2.0	Teleware Inc.	274	464	Avery Personal Label Printer	Avery Commercial Products Division	344	414	WEB DataFiles 8.16	WordStar International Inc.	59
AFTER HOURS				465	CoStar AddressWriter	CoStar Corp.	359	413	WordStar, Version 7.0	WordTech Systems Inc.	59
501	Annual Membership	Computer Pilots Association of America	486	466	CoStar LabelWriter II	CoStar Corp.	349	415	TK Solver, Version 2.0	Universal Technical Systems Inc.	59
509	Instrument Flight Trainer-PRO	Flight Deck Software	486	408	Eltron LP-2042	Eltron International Inc.	349	READ ONLY			
506	H1 Flight Controls	Flight Link	486	467	Fujitsu DL5800	Fujitsu Computer Products of America Inc.	59	496	Using WordPerfect for Windows, Special Edition	Que (Prentice Hall Computer Publishing)	71
505	Flight Planner	Mallard Software	486	469	Seiko Smart Label Printer Plus	Seiko Instruments USA Inc.	359	495	Mastering WordPerfect 5.1 for Windows	Sydex Inc.	71
503	Sound, Graphics, and Aircraft Upgrade	Mallard Software	486	469	Tidemark Address Express	Tidemark Corp.	360	494	PC Magazine Guide to WordPerfect for Windows	Ziff-Davis Press	71
510	FiteSchool, Private Pilot version	MentorPlus	486	SOFTWARE				TOOLKITS			
500	Microsoft Aircraft and Scenery Designer	Microsoft Corp.	486	418	BeckerTools 3	Abacus	52	451	Object Professional for C++	TurboPower Software	77
497	Microsoft Flight Simulator, Version 4.0	Microsoft Corp.	486	406	SlideWrite Plus for Windows, Version 1.0	Advanced Graphics Software Inc.	59	PRODUCTIVITY			
507	Cockpit Trainer	Novel Twist Inc.	486	DEPARTMENT				PROGRAM NAME / DESCRIPTION			
498	Computer Flight Instructor Tapes	SimuTech Corp.	486	SOLUTIONS				PAGE			
508	Flight Assignment A.T.P.	subLogic	486	Advisor	Options for adding memory to IBM's PS/2 systems						367
499	Great Britain Scenery Collection	subLogic	486	Advisor	Unload NetBIOS from memory without rebooting						367
504	Jiffy Facility Locator III	TekMate	486	Tutor	A method for easily choosing among several configurations						369
502	Scenery Enhancement Editor	TekMate	486	User-to-User	Three ways to tell whether your batch files are executing under Windows.						371
COMPUTERS				The Working Word	Searching for hyphens in WordPerfect 5.1						373
430	AST Premium Exec 386SX/25C	AST Research Inc.	40	Spreadsheets	Keeping your Excel database's print area current						375
401	GRiD PalmPAD	GRiD Systems Corp.	59	Spreadsheets	Setting WYSIWYG printer defaults.						375
425	IBM PS 2 56 SLC	IBM Corp.	37	Connectivity	A product that can control power to devices over the phone.						377
426	Powermate 486/33i	NEC Technologies Inc.	48	Connectivity	A product that organizes e-mail messages						377
403	ProSpeed 486SX with 120MB hard disk	NEC Technologies Inc.	59	PC MagNet	Some advanced programs that help you use ZiffNet more efficiently						378
431	Toshiba T4400SXC	Toshiba America Information Systems Inc.	40	PROGRAMMING				Utilities			
CONNECTIVITY				Utilities	You can end the download delay with BACKDOWN.EXE.						380
461	VINES Option for Macintosh, Version 5.0	Banyan Systems Inc.	220	Lab Notes	Putting serial port technology in Perspective, Part 1.						390
				Environments	Creating a computer drum machine, Part 1.						394
				Power Programming	Processing ink in a pen windows application.						397
				Databases	Using BROWSE for multifield pick lists in dBASE IV.						401
				Databases	Using the TONE() function for a delay in Clipper.						401
				Databases	Optimizing field sizes in dBASE and FoxPro.						401
				Languages	Squeeze 2K to 4K out of your C programs with DATETIME.C.						403

After Hours

Products for the Leisure Side of Personal Computing

Flight 505: Unleashing The 747 Inside Your 386

FLIGHT SIMULATION
by Alfred Poor

Computers have the ability to simulate an incredible range of real and imagined settings. For those of us who are drawn to the exploits of the Wright brothers or Lucky Lindy, putting our hands on the keyboard can put our heads in the clouds without ever leaving the ground.

Microsoft Flight Simulator is arguably the best-selling computer game of all time, but you might be surprised to find out how many related products are available that can make the product even more exciting and realistic. These products are the focus of this special After Hours, devoted to computers and aviation.

So tie on your silk scarf, strap on your goggles, and hit the starter!

LEARNING TO FLY

Microsoft Flight Simulator has put more planes on more computer screens than any other program (it's now in its fourth major revision—often referred to as *FS4*), and it carries a list price of \$64.95. While some flying programs let you simply go wherever you point your plane's nose, *FS4* faithfully models real aerodynamic ef-

fects. Fly too slowly or turn too sharply and you will fall out of the sky.

While this realism makes flying more exciting, it also makes some aspects of the program more challenging—especially landings. More than a few users have been frustrated by splashing a Cessna into Lake Michigan one time too many. True, the program does include an instruction mode, but it is not that effective in teaching you how to fly.

In the real world, student pilots have a CFI (certified flight instructor) sitting in the right seat to give instructions and advice. *Computer Flight Instructor Tapes*, a pair of audiocassette tapes from SimuTech Corp. (\$14.95 and \$16.95), are your guide to *FS4*.

The basic tape is suitable for a novice, and starts you off slowly. You become familiar with principles of flight and the keyboard commands used to control your airplane. The tape also teaches a foolproof landing technique by splitting the process into separate components; it also teaches you how to use power settings and airspeed control to make a perfect touchdown every time. This alone is worth the price of admission, but you get much more.

The Basic tape also introduces you to cross-country travel and rudimentary radio navigation techniques. The Advanced tape goes further into navigation and the finer points of *FS4*. Both tapes make liberal use of simulated radio transmissions from Air Traffic Control and other planes, and tell you the correct responses to make—just like real pilots.

The *Computer Flight Instructor Tapes* aren't perfect. The instructions are more approximate than precise in some spots, but these are small problems compared with the excellent instruction and the near-guaranteed success they offer. Whether you are an *FS4* novice or you simply want to fine-tune your skills, these tapes are highly recommended.

List Price: *Microsoft Flight Simulator*, Version 4.0, \$64.95.
Requires: 640K RAM, 1.5MB hard disk space, DOS 2.0 or later. Microsoft Corp., One Microsoft Way, Redmond, WA 98059; 800-426-9400.

CIRCLE 497 ON READER SERVICE CARD

List Price: *Computer Flight Instructor Tapes*, \$14.95 (Basic), \$16.95 (Advanced). SimuTech Corp., P.O. Box 274112, Tampa, FL 33688-4112; 800-226-7820.

CIRCLE 498 ON READER SERVICE CARD

NEW HORIZONS

The default scenery of the New York, Chicago, Seattle, San Francisco, and Los Angeles areas are interesting, but sooner or later you will wish you had somewhere else to fly. Maybe you don't live in those areas, and you would like to have your local airstrip on your computer. Or maybe you would just like to

FLIGHT

Planes, scenery and actual flight consoles: A look at the products that make PC flying more real.

fly to some exotic locale that you might not otherwise get to visit.

The good news is that hundreds if not thousands of additional airports are available. The chances are excellent that your favorite location is on a disk somewhere, waiting for you to discover it.

Perhaps you would like to buzz Buckingham Palace or fly over the white cliffs of Dover and the North Sea oil fields. Well, now you can fly all around the British Isles with *Great Britain Scenery Collection* from subLogic for \$59.95.

This *FS4* add-on includes detailed charts and essential information about the airports, navigation aids, and points of interest in Ireland, Scotland, England, and Wales—all contained in scenery files. (subLogic also offers other scenery disks, including Japan, Hawaii, Western Europe, and certain areas of the United States.)

Microsoft also offers an add-in of its own for *FS4* called *Microsoft Aircraft and Scenery Designer*, or *ASD* for short, with a list price of \$39.95 (see the After Hours review, June 11, 1991). This product makes it possible to create new scenery files on your own, as well as to design new aircraft. But the process can be time-consuming, and there are many other sources of *ASD* scenery that you can use without having to create them yourself.

One of the best sources is

CONTINUES

For a change of scenery, try buzzing the lighthouse off the famous cliffs of Dover, England, with subLogic's *Great Britain Scenery Collection*.



After Hours

Flight

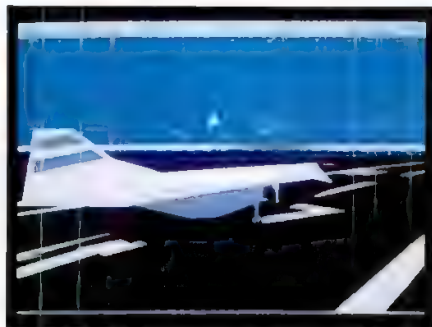
CONTINUED

the Flight Simulator Forum (FSFORUM) located on CompuServe. There is a huge library of ASD scenery files, including a collection that allows you to fly from Florida through the Bahamas all the way down to Puerto Rico. These Caribbean files were a joint project involving a group of forum members, and were the basis for a forum "fly-in" to Puerto Rico this past winter.

An FSFORUM fly-in takes advantage of FS4's multi-player features so that members can dial up and "land" at the destination. FSFORUM is also an excellent source of advice and information about all sorts of computer aviation products.

You can also find a wide selection of FS4 files with ASD scenery from the Computer Pilots Association of America (CPAA). This is a membership organization (\$35 annual dues) that also distributes a variety of scenery and utility files for \$10. You can also get out-of-print subLogic scenery disks 1 through 6 for \$17.50 each, or \$85 for all six; these cover areas in the western half of the country. Members get a discount on the scenery disks, as well as a quarterly newsletter that includes product reviews and flying tips. CPAA sponsors an annual meeting, with the second annual event coming up on May 29 at Cornell University in Ithaca, New York.

Should you want to get into creating your own scenery for FS4 with ASD, there are add-on products that can make the work more efficient and flexible than what is offered with Microsoft's ASD. The *Scenery Enhancement Editor (SEE)* by TekMate (\$34.95) makes it easy to add objects to scenery files created for FS4 with ASD. It comes with a library of predefined objects—signs, towers, lights, runway skid marks, a lighthouse, and even a blimp—that you can add to your scenery or modify to create new objects. TekMate also sells addi-



Mallard Software's Sound, Graphics, and Aircraft Upgrade adds a hangerful of new planes to FS4, including the Concorde shown here at takeoff.

tional library disks with more objects.

Whether you use the pre-built objects or design your own, SEE makes it easy to place them, and also to add day, dusk, or night lighting effects. The program leaves your original scenery files unchanged and creates a new copy with your enhancements added. Note that you just need FS4 with ASD to use the resulting scenery; you need SEE only to create it initially.

List Price: *Great Britain Scenery Collection*, \$59.95.

Requires: Microsoft Flight Simulator 4.0, subLogic, 501 Kenyon Rd., Champaign, IL 61820; 800-637-4983, 217-359-8482.

CIRCLE 409 ON READER SERVICE CARD

List Price: *Microsoft Aircraft and Scenery Designer*, \$39.95.

Requires: 640K RAM, 1.5MB hard disk space, DOS 2.0 or later. Microsoft Corp.

CIRCLE 500 ON READER SERVICE CARD

List Price: Computer Pilots Association of America, annual membership, \$35. CPAA, P.O. Box 580608, Houston, TX 77258-0608; 713-333-4698.

CIRCLE 501 ON READER SERVICE CARD

List Price: *Scenery Enhancement Editor*, \$34.95.

Requires: 640K RAM, DOS 2.0 or later. TekMate, 15307 Parkville, Houston, TX 77068; 713-440-7364.

CIRCLE 502 ON READER SERVICE CARD

SOUND AND LIGHT

Of course, if you're going to have all this detailed scenery to fly through, you'll want it to look better on your screen. One of FS4's biggest limitations has been its limited support for VGA-resolution screens. Mallard Software is another publisher of FS4 add-on products, and it recently released the \$39.95 *Sound, Graphics, and*

Aircraft Upgrade (SGA for short). This program adds some new VGA drivers: for 640-by-400 resolution with 16 colors, as well as 640-by-480 and 800-by-600 resolutions with 16 colors for certain ATI and Video Seven Super VGA cards and cards based on the Tseng Laboratories 4000 chip. (Running FS4 at 800-by-600 resolution may be too slow on most computers, however.)

SGA adds more than just better resolution; it comes with new planes, including an ultralight, a World War II P-51, and a supersonic Concorde SST. It also adds sounds. While some can be heard using the PC's internal speaker, you'll want to get one of the supported sound boards for best effect: the Sound Blaster or Sound Blaster Pro (from Creative Labs), the Stereo/FX (ATI), the AdLib Gold (AdLib), or the Voice Master (Covox). With one of the Sound Blasters, you can even hear the Air Traffic Control messages instead of having to read them off the screen.

There are more developments in store for video displays. ATI has released a beta version of an FS4 driver for its 8514-compatible cards, including the 8514 Ultra, the Graphics Ultra, and the Graphics Vantage. These cards can display 256-color images in stunning detail, which greatly enhances

the realism. Instead of having solid colors to represent the ground and sky, ATI's driver uses graduated shades that realistically fade the earth and sky to meet at a light, hazy horizon. In spite of the video accelerators, the frame rate (how frequently the screen is updated) is slower than it should be—even on a 25-MHz 386—but this is an impressive sign of things to come.

List Price: *Sound, Graphics, and Aircraft Upgrade*, \$39.95.

Requires: Microsoft Flight Simulator 4.0. Mallard Software, 550 Edmonds Rd., #201, Lewisville, TX 75067; 214-436-0044.

CIRCLE 503 ON READER SERVICE CARD

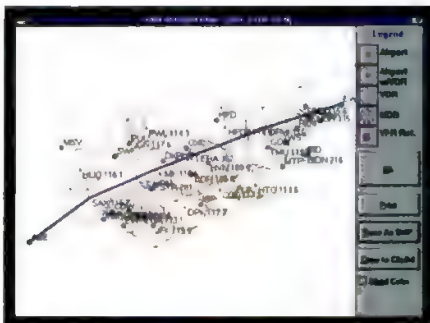
MORE ADD-ONS

Once you have a choice of airplanes, realistic engine noises, sound effects, and a few dozen exciting new places to fly, you will want to consider some of the add-on products that can make simulated flight easier and more enjoyable.

One problem FS4 has is that since it's a large scenery-file collection, it doesn't have a simple way to start you at a given airport. You can create your own modes by entering geographical coordinates, set all your radio frequencies by hand, and then save these settings as an FS4 mode. Or you can use a product like TekMate's *Jiffy Facility Locator III* (\$18.95). JFL maintains a database of airports, complete with navigation radio frequencies. Just pick your airport and JFL can "launch" you by running FS4 and loading all the desired settings. It can even automatically manage your FS4 memory configuration to match the scenery's requirements.

Perhaps you want to plan

CONTINUES



This Flight Planner flight plan—from Allentown, Pennsylvania to New Bedford, Massachusetts—shows airports and navigational aids en route.

After Hours

Flight

CONTINUED

your trips in advance. Mallard Software's *Flight Planner* (\$39.95) is actually two programs in one—a DOS version and a Windows version. You enter the departure and destination fields and the program will automatically create a flight plan for you, including visual and radio-navigation way points and listings of all relevant radio frequencies and runway specifications. It will even adjust your course headings and estimated travel time based on the "forecasted" winds. You can display your route on detailed on-screen maps; the Windows version also lets you print your maps. If the program took Air Traffic Control and other FAA requirements into account, you could even use this for planning real-life flights.

And speaking of real life: You may have noticed that not many airplanes are equipped with keyboard controls. *FS4* is designed to accept other forms of input, such as a joystick attached to game ports, but if you are serious about flying, you might want to consider a PC control panel.

Flight Link offers a number of separate components, but this company also has an integrated unit called the H1 Flight Controls (\$1,245), which includes a desktop module with control yoke, throttle, mixture, carb heat, radio-panel controls, and switches for everything from flap settings to nose trim. There is even a key switch for starting the engine. The H1 also has a set of rudder pedals available as an option (\$245) for

more realistic control. The system attaches to your computer's serial and game ports, and it relies on a special driver to work with different flight simulation programs, including *FS4*.

The Cockpit Trainer from Novel Twist takes a different approach. It uses membrane switches for everything except the control yoke and the throttle; the company provides different "personality" modules that remap the switches for different flight simulator programs, and is developing overlays that relabel the buttons. Unlike Flight Link's product, the \$749 Novel Twist console plugs directly into your computer's keyboard port without any extra drivers or ports, so setup is simple (your keyboard then plugs into the console, which passes keyboard signals on to the computer). You can also get some sturdy rudder pedals for \$249, but these need to be mounted on a floorboard assembly; Novel Twist will provide a suitable wooden box ready for painting for \$69.

Choosing between these two is mostly a matter of taste. The Novel Twist yoke has a more realistic feel than the Flight Link model, but the switches on the Flight Link product look and feel more like a real airplane cockpit.

List Price: *Jiffy Facility Locator III*, \$18.95. TekMate.

CIRCLE 504 ON READER SERVICE CARD

List Price: *Flight Planner*, \$39.95. **Requires:** 512K RAM, 1.5MB hard disk space, DOS 2.0 or later. Mallard Software.

CIRCLE 505 ON READER SERVICE CARD

List Price: H1 Flight Controls, \$1,245; Rudder Control Module, \$245. Flight Link, 4280 Green Meadow Ln., Chico, CA 95926; 916-891-4987.

CIRCLE 506 ON READER SERVICE CARD

List Price: Cockpit Trainer,

Try your hand
as a commercial
airline pilot without
risking corporate
takeovers and
bankruptcy
with *Flight
Assignment:
A.T.P.*



\$749; rudder pedals, \$249; pedal mounting box, \$69. Novel Twist Inc., 572 Royal Palm Dr., Melbourne, FL 32935; 407-254-6484.

CIRCLE 507 ON READER SERVICE CARD

OTHER SIMULATIONS

As good as *FS4* is, you may find that you want more from your flying experience. For example, you may have dreams of piloting "heavy iron" on transcontinental or transoceanic routes. Get behind the controls of a Boeing 737 or 747 or an Airbus 320 and try your hand at the top level of flying—as an airline transport pilot. Not only is this the highest rating you can earn, it is also the name of a program from subLogic: *Flight Assignment: A.T.P.* (\$59.95). As an airline pilot, your success at on-time arrival and precision flying will help you climb through the ranks. You will have to learn to navigate and respond to the real-time instructions of "intelligent" Air Traffic Control. There are also automated modes (just as on some of the big jets) that can do most of the work for you.

On the other hand, maybe your tastes run more toward Beechcraft than Boeing, and you want more challenging small-plane experiences. While you can certainly use *FS4* for instrument flight (flying without outside references, such as when in the clouds), you might want to try one of the more exacting programs. One example is *Instrument Flight Trainer-PRO (IFT-PRO)* from Flight Deck Software (\$499.95.) Designed for instrument flight practice, the program provides only a small and simple view out the window—just enough to get you on the ground after you break through the bottom of the overcast layer.

The bulk of the display is taken up by instruments. You can quickly and easily design your own panel, and you can also disable certain instruments if you want to practice procedures with one or more failed components. An impressive map feature shows all radio navigation aids and airports as well as your plane's track on a moment-by-moment basis. This is an excellent training tool, since the track shows your plane's position moment by moment; it also shows you power and control settings, vertical and horizontal speeds, and heading.

Flight Deck Software is working on a more realistic version of the program that incorporates digitized soundtracks of Air Traffic Control transmissions (taken from the ProSim radio training tapes from Simu-Tech Corp.), which are event-triggered during your flight. This means that once you have navigated to a given distance from your destination, you will receive radio instructions just as you would in life. There is no voice-recognition feature built in to receive your replies, but just trying to say the "right" responses quickly at the same time that you're trying to navigate through the clouds makes the flying experience that much more realistic and challenging.

List Price: *Flight Assignment: A.T.P.*, \$59.95. **Requires:** 512K RAM, 1.4MB hard disk space, DOS 2.0 or later. subLogic.

CIRCLE 508 ON READER SERVICE CARD

List Price: *Instrument Flight Trainer-PRO*, \$499.95. **Requires:** 1MB RAM, DOS 2.0 or later. Flight Deck Software, P.O. Box 425, Williamsburg, VA 23185; 800-955-4359, 804-229-1757.

CIRCLE 509 ON READER SERVICE CARD

CONTINUES



The flight controls from Flight Link (top) and Novel Twist add a higher level of realism to your flying experience.

After Hours

Flight

CONTINUED PURSUING YOUR TICKET

Of course, the remaining step is reality—getting your private pilot's license. If you're looking for advice about real flying, check out the AVSIG Forum on CompuServe. AVSIG is to real flying what FSFORUM is to simulated flight, and you may be surprised to find that there are many people who frequent both areas.

AVSIG's regulars include air traffic controllers, private pilots, instructors, members of the aviation press, and commercial airline and freight pilots, as well as a fair number of wannabes. You can find everything: The forum will give you advice on how to pick a training school, teach you which headset to buy, and show you the secret of how to make a smooth

landing in a crosswind.

In addition to flight training (40 to 60 hours worth) and a final check ride with an FAA examiner, you will also need to take a written, multiple-choice exam that covers all aspects of general aviation, from navigation procedures to FAA regulations. The exam includes questions about weather, engines, aerodynamics, charts, and radios.

Fortunately, your computer can even help here. *FliteSchool*, from MentorPlus Software, contains the entire database of FAA questions and can present them to you in different ways. One of the most useful is the "cybernetic" mode, which keeps track of the areas where you are weak and sticks with a topic until you have mastered it. If you want, the program can also produce sample tests, so you can see for yourself how well you would do if you took the real test.

If this were all *FliteSchool* did, it would be worth the price,



If you are serious about flying in the clouds, you'll want to practice instrument navigation techniques using *Instrument Flight Trainer-PRO*.

but there's more. The program has a practice mode that offers clues on the right answer, so you can use it as a study aid. There are also graphics screens that can provide a visual explanation of the principle behind the test question. Finally, there is a hypertext system of reference screens that are linked to the content of each question, making it easy to obtain more detail about any topic. You will still need to rely on other references to learn the material, such as a good textbook, but *FliteSchool* will be your tireless companion as you study, and

will tell you when you are ready to take the test.

So there's a lot more to flying with computers than just buzzing the Sears Tower in Chicago. If you're itching to explore the wild blue yonder—either on-screen or in real life—your keyboard is a great place to start.

List Price: *FliteSchool*, Private Pilot version, \$89.95. **Requires:** 512K RAM, DOS 2.0 or later. MentorPlus Software Inc., 22775 Airport Rd. NE, P.O. Box 356, Aurora, OR 97002-0356; 800-448-3852, 503-678-1431.

CIRCLE 510 ON READER SERVICE CARD

She's 5 years old.
She's already had 7 names,
16 identities and
21 homes.

Every year thousands of children are kidnapped by their own parents. Beginning the tragic ordeal of life on the run.

Child Find offers an end to the running. With our toll-free number and our mediation program, we offer a way out for the parents and for the kids.

For us, it's a labor of love. But unfortunately, we can't operate on love alone.

To find out how you can help, or if you need our help, please call 1-800-A-WAY-OUT. And help another child find a more peaceful future.



CHILD FIND OF AMERICA INC.



PC & Mac
Multimedia
CD ROM

Only \$99

Great Literature
Personal Library Series

Now the FULL TEXT of 943 literary works—Novels, Biographies, Plays, Poems, Stories, Science Papers... are all on a single CD ROM! And great literature makes these works come alive with pictures, full color illustrations, engravings, and narrations by Bob Saget, Dave Coulier and George Kennedy. It's a fantastic value for every researcher, student and literature lover. With works from Aesop to Wordsworth, Great Literature is the library that no one should be without.

"The time has finally come to catch up with a good computer." —New York Times

Bureau of Electronic Publishing, Inc.
111 New Road Parsippany, NJ 07054

Order from your CD-ROM dealer or call:
800-828-4766 phone: 201-808-2700 fax: 201-808-2676

CIRCLE 181 ON READER SERVICE CARD

PC Magazine reaches
over 870,000
Brand Specifiers

Abort, Retry, Fail?

The Lighter Side of Personal Computing

**LOW
PRODUCTIVITY
PRICES**
Get organized
for less.
Page 3

SOI

How many ways can
you read the phrasing in this Software Etc. ad?

Men of Few Well-Chosen Words Dept.

"They went on to say that the next revision of the board has been tested with the new CPU and encountered no heat problems; therefore, the heat sync and fan would eventually not be required."

—Infoworld, January 20, 1992

"And what about Visual Basic? I initially went completely head over heels nuts about it, I admit."

—Steve Gibson, "Tech Talk," Infoworld,
February 24, 1992



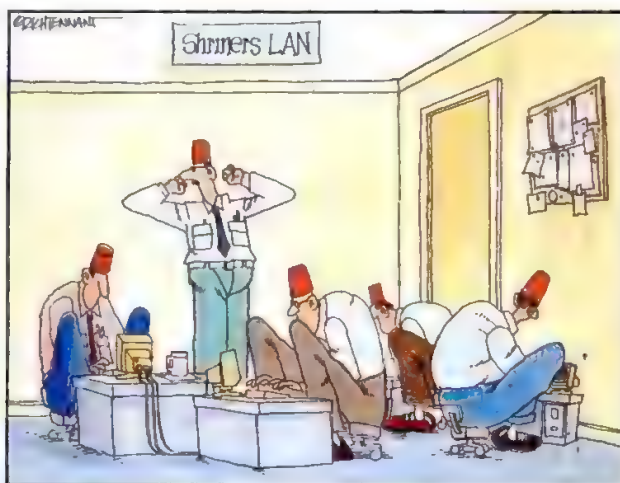
Just what every 14-millisecond hard disk needs: its own mouse (new product announcement, *Computer*, November 1991).

Heavy Advice for the Frequent Traveler

"Running floppy disks through airport X-ray machines and metal detectors won't damage them or erase data. But if you're paranoid—and, frankly, who isn't?—get your disks hand inspected. Or buy an iron-plated disk case from a computer specialty store."

—Frequent Flyer, January 1992

If your entry is used in *Abort, Retry, Fail?* we'll send you \$50 and a *PC Magazine* T-shirt. Caution: In case of multiple entries, the postmark date, neatness, and completeness of each entry are considered. Winners this issue: Richard L. Bowersox (low productivity), Alan C. Bartlett (nini-tower), James A. Wolff (Nouvelle), Bill Steele (iron-plated disk case), Steve Lefton (hard disk...a mouse), Rubin Rabinovitz (head over heels), David S. Reinhart (heat sync).



CARTOON: RICHARD TENNANT

FREE WINDOW PACKAGE

386-33 SVGA \$1695

- 64K CACHE
- 2 MEG RAM (70NS)
- 1.2 FLOPPY (TEAC)
- 89 MEG HARD (19 MS) (SEAGATE)
- 28 SUPER-VGA MONITOR (SHAMROCK)
- 16 BIT SVGA CARD
- 101 ENHANCED KEYBOARD
- DESKTOP OR NINI-TOWER
- 8 EXPANSION SLOTS
- 230 WATT POWER SUPPLY

CONDWELL 286-12 MHZ

FREE WINDOW PACKAGE

La Jolla Computers of Utah presents an intriguing choice of case designs: standard desktop or "nini-tower."

Classified Intelligence

"Computer Network Manager. Aggressive multi-unit company offers ground floor opportunity to recent computer science graduate. Needs Unix, COBOL, C, Nouvelle..."

—The Orange County Register, January 5, 1992



Early contender for 1992's most unusual alternate input device: the \$199 Twiddler mouse-pointer-keyboard from Handykey Corp. (516-474-4404). Strap it to your wrist, move your hand, and the cursor on-screen

tracks your hand movement. It also can be used as a keyboard for entering text. How good? Let's say it's an acquired taste.

TAKE OR YOU MIGHT GET TAKEN.

Take our advice and send in this reply card. You'll get a catalog chock-full of information about our computers, service and support.

And you'll quickly see why Dell has become an over 800 million dollar business in just seven and a half years. Why we won over 53 product awards last year. And why

two-thirds of the FORTUNE 500® will be Dell customers for years to come.

All because at Dell, no customer is taken lightly.

TO ORDER, CALL PLEASE REFERENCE #11BU6.

800-873-1130

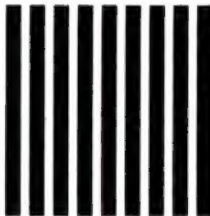
HOURS: 7AM-9PM CT M-F, 8AM-4PM CT SAT, 10AM-3PM CT SUN.

IN CANADA, 800-668-3021. IN MEXICO, 95-800-010-0664.

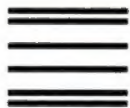
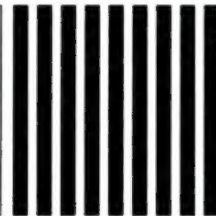


FORTUNE 500 is a registered trademark of The Time Inc. Magazine Company. ©1992 Dell Computer Corporation. All rights reserved.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 6245 AUSTIN, TEXAS

POSTAGE WILL BE PAID BY ADDRESSEE

DELL COMPUTER CORPORATION
DEPT DH
9505 ARBORETUM BLVD
AUSTIN TX 78759-9860



BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 6245 AUSTIN, TEXAS

POSTAGE WILL BE PAID BY ADDRESSEE

DELL COMPUTER CORPORATION
DEPT DH
9505 ARBORETUM BLVD
AUSTIN TX 78759-9860



IF THESE MAKE A GOOD IMPRESSION, WAIT TILL YOU MEET THE REST OF THE FAMILY.



Dell 320N+ 20 MHz i386SX System
System includes:

- 4 MB RAM
- 60 MB Hard Drive
- VGA Edgelit LCD
- 4-hour battery life on NiMH battery
- 6.8 lbs.
- 8½ x 11" footprint
- Full-travel keyboard



Dell 486P/33 33 MHz i486 System
System includes:

- 4 MB RAM
- 120 MB Hard Drive
- UltraScan 14C Monitor
- Upgradeable Processor board
- 1024 x 768 integrated video support
- RAM expansion to 64 MB
- 1 floppy drive



Dell 420DE 20 MHz i486 System
System includes:

- 4 MB RAM
- 120 MB Hard Drive
- VGA Color Plus Monitor
- Upgradeable processor board
- 1024 x 768 integrated video support
- RAM expansion to 96 MB
- 1 floppy drive



Dell 433SE 33 MHz i486 System
System includes:

- 4 MB RAM
- 230 MB Hard Drive
- UltraScan 14C Monitor
- Upgradeable processor design
- 128 KB external cache
- RAM expansion to 128 MB
- 1 floppy drive

Send for the brand new Dell product catalog, loaded with information on all our award-winning computers, service and support. Plus, get the details on our newest PCs, notebooks and servers. Return this card today, or call us at (800) 873-1130. In Canada, call (800) 668-3021. In Mexico, call 95-800-010-0664.

☐ Please have a Dell representative call me.

Name: (M) _____
(Please Print)
Title: _____
Company: _____
(If applicable)
Address: _____
City: _____ State: _____ Zip: _____
Type of Business: _____
Approx. # of employees in company: _____
Installed # of PCs in your company: _____
Home Phone: () _____
Business Phone: () _____
Fax Number: () _____

1. Which products are you most interested in, and how many do you plan to purchase in the next 12 months?

Timeframe	i486	i486SX	i386	i386SX	Notebook	Other
Less than 1 month						
1-3 months						
3-6 months						
6-12 months						
More than 12 months						

2. If you resell, please identify your primary customers:
☐ Education ☐ General Business ☐ Government ☐ Medical

3. By which method do you acquire PCs?
☐ Mfg rep calls on me directly ☐ Local retailer
☐ VAR/Integrator ☐ Mail order/direct

4. From whom do you currently purchase PCs? _____

5. Are you interested in leasing? () Yes () No AD CODE 51BU6

Send for the brand new Dell product catalog, loaded with information on all our award-winning computers, service and support. Plus, get the details on our newest PCs, notebooks and servers. Return this card today, or call us at (800) 873-1130. In Canada, call (800) 668-3021. In Mexico, call 95-800-010-0664.

☐ Please have a Dell representative call me.

Name: (M) _____
(Please Print)
Title: _____
Company: _____
(If applicable)
Address: _____
City: _____ State: _____ Zip: _____
Type of Business: _____
Approx. # of employees in company: _____
Installed # of PCs in your company: _____
Home Phone: () _____
Business Phone: () _____
Fax Number: () _____

1. Which products are you most interested in, and how many do you plan to purchase in the next 12 months?

Timeframe	i486	i486SX	i386	i386SX	Notebook	Other
Less than 1 month						
1-3 months						
3-6 months						
6-12 months						
More than 12 months						

2. If you resell, please identify your primary customers:
☐ Education ☐ General Business ☐ Government ☐ Medical

3. By which method do you acquire PCs?
☐ Mfg rep calls on me directly ☐ Local retailer
☐ VAR/Integrator ☐ Mail order/direct

4. From whom do you currently purchase PCs? _____

5. Are you interested in leasing? () Yes () No AD CODE 51BU6

TO ORDER, CALL PLEASE REFERENCE #11BU6.

800-873-1130

HOURS: 7AM-9PM CT M-F, 8AM-4PM CT SAT, 10AM-3PM CT SUN.

IN CANADA, 800-668-3021. IN MEXICO, 95-800-010-0664.

DELL
COMPUTER
CORPORATION

TO ORDER, CALL PLEASE REFERENCE #11BU6.

800-873-1130

HOURS: 7AM-9PM CT M-F, 8AM-4PM CT SAT, 10AM-3PM CT SUN.

IN CANADA, 800-668-3021. IN MEXICO, 95-800-010-0664.

DELL
COMPUTER
CORPORATION

THEIR NOTEBOOK IS SLOWER, WIDER AND COSTS ABOUT TWICE AS MUCH. WHAT MORE DO YOU NEED TO KNOW?

Dell's phone number is

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509. 1-800-247-5509.

It's true, that phone number really is the only thing you need to know. You don't need to know about Dell's highly acclaimed service and support, and the fact that each computer goes through tests the Marines would be proud of (all without the mark-ups and hassles of traditional retail channels). All of which has won us scads of customer satisfaction awards and helped make Dell an 890 million dollar international business in just eight years. But you don't need to know any of that, just give us a call.

**DELL
COMPUTER
CORPORATION**

800-247-5509

TO ORDER, CALL PLEASE REFERENCE #118T5.
HOURS: TUE-THU 9AM-5PM, FRI 9AM-4PM, SAT 10AM-3PM. CT SUN. IN CANADA, 800-468-3021.
IN MEXICO, 95-800-010-0664.



Lease: \$60/mo.**

THE NX20 FROM DELL. 20 MHz i386™ SX SYSTEM.
System includes 2 MB RAM, 40 MB Hard Drive, VGA LCD, 3.5" floppy drive, 8.3" x 11" x 2"; 6.8 lbs.



Actual dealer prices may vary.

TOSHIBA T2000SX 16 MHz i386SX SYSTEM.
System includes 2 MB RAM, 40 MB Hard Drive, VGA LCD, 3.5" floppy drive, 10" x 12.2" x 1.9"; 6.9 lbs.



**RED
PURPLE
BLUE
VIOLET
GREEN
BEIGE
BROWN
BLACK
YELLOW
MAUVE
MAGENTA
PINK
ORANGE
NAVY
SIENNA
OLIVE.**

**BLACK
WHITE
AND
TOO MUCH
GREEN.**



Lease*: \$156/MO.**
**THE DELL 325NC 25 MHz
i386SL SYSTEM**

SYSTEM INCLUDES 4 MB RAM,
80 MB HARD DRIVE, COLOR VGA LCD.



Actual dealer prices may vary.
**TOSHIBA T3300SL 25 MHz
i386SL SYSTEM**

SYSTEM INCLUDES 4 MB RAM,
80 MB HARD DRIVE, VGA LCD.

For up to \$179 less than a black and white notebook, a new Dell® 325NC. With a screen that can display 16 colors from a palette of over 262,000 colors. And Dell's legendary service and support. So if paying too much green makes you see red, order a 325NC.

PC
MAG

L
I
B
R
A
R
Y

TECH STUFF

i386™SL microprocessor running at 25 MHz • 640 x 480 passive matrix color LCD • 4 MB RAM, expandable to 12 MB • 64 KB cache memory • 3.5" 1.44 MB floppy • 3 hour battery life using Nickel Metal Hydride battery • 7.1 lbs • 8.5" x 11" x 2.3" • 85-key keyboard with inverted "T" cursor control • 60 MB and 120 MB HD also available.

SERVICE AND SUPPORT

Nationwide on-site lapside service contract included in the system price the first year* — Toll-free technical support hotline — Toll-free TechFax™ line for 24-hour system information — On-line Bulletin Board communication with technical staff and other users — Self-diagnostic software — Free factory installation of selected MS-DOS® software applications — Support Forum on CompuServe Information Service.



To order, call. Please reference #11BU4.

800-247-2063

Mon-Fri between 7am-9pm CT, Sat 8am-4pm CT, Sun 10am-3pm CT • In Canada, (800) 668-3021 • In Mexico, 95-800-010-0664 • Shipped with a 30-day no questions asked money-back guarantee.

**DELL
COMPUTER
CORPORATION**

